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## FOCAL INFECTION AND SYSTEMIC DISEASE: A CRITICAL APPRAISAL

### THE CASE AGAINST INDISCRIMINATE REMOVAL OF TEETH AND TONSILS

CLINICAL LECTURE AT ST. LOUIS SESSION


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AND
W. PAUL HAVENS, M.D.
PHILADELPHIA


The concept of focal infection in relation to systemic disease is firmly established. The origin of many toxic or metastatic diseases may be traced to primary local or focal areas of infection. As examples, gonorrhea and gonococcic arthritis, furuncles and septicemia, tetanus and other self-limiting diseases may be cited. It is not surprising, therefore, that a similar relationship is thought to exist between various general systemic diseases of unknown origin and infections of the teeth, tonsils, nasal sinuses, appendix, gallbladder and cervix and infections elsewhere. Such a theory at least was elaborated and popularized chiefly after the publications of William Hunter and Frank Billings between 1910 and 1915. The enthusiasm thus aroused was further enhanced by the experimental work of Rosenow and others until focal infection with regard to infected teeth and tonsils seemed to be the cause of a great variety of diseases.

Our purpose in this inquiry is to test the validity of the theory and its application. We have reviewed many of the papers published since Holman's [1] critical discussion of 1928, in an attempt to gather evidence to show that the causative relationship of infections about the teeth and tonsils to systemic disease is unproved, and that the removal of teeth and tonsils in an effort to influence the course of systemic diseases is unjustified in the majority of cases.

### "INFECTED TEETH"

As pointed out in a recent editorial,[2] Hunter's views as expressed in 1910 have been misinterpreted. He spoke chiefly of infections arising from ill fitting dentures and crowns, not of apical abscesses about pulpless teeth which now are usually regarded as "infected teeth." Nevertheless the belief that infections about the teeth give rise to much systemic disease seems to be supported by various data: (*a*) bacteriologic studies of teeth often give positive results, (*b*) roentgenograms may show radiolucent periapical areas, (*c*) by inoculation experiments it seems possible to reproduce similar disease in animals, and (*d*) recovery occasionally occurs after the extraction of teeth. That most of these data have been subject to misinterpretation is made evident as follows:

(*a*) *Bacteriologic Studies of Extracted Teeth.*—Most of the bacteriologic studies dealing with infection in and about the roots of pulpless teeth are invalid because of the technical difficulties of preventing contamination during extraction.[3] Since then, Burket,[4] for example, found bacteria present in pure culture or in mixtures in the apical areas of 43 per cent of clinically normal teeth, tested with aseptic precautions. Streptococcus viridans was found in 89 per cent in pure culture or with other bacteria. Pure cultures were more often obtained from teeth with no periapical roentgenographic changes. Tunnicliff and Hammond [5] and others [6] found that many teeth with sterile surfaces showed Streptococcus viridans in the pulps. There is often no evidence of infection on microscopic examination of pulpless teeth and adjacent tissues even though bacteria are present, so that the mere presence of bacteria does not mean that they are pathogenic.

(*b*) *Roentgenologic Studies.*—In the search for foci of infection it is customary to make roentgenograms of the teeth. It is a common practice among roentgenologists to report an abnormal area of lucency around the root of a tooth as a periapical abscess. This custom alone has been responsible for the loss of many sound teeth since many such radiolucent areas are not caused by infection.[7] It is impossible to estimate the pathologic significance of abnormalities by roentgenographic studies alone.[8] Periapical restoration of bone and obliteration of areas of rarefaction may occur spontaneously if given time enough or after proper treatment of disease of the root canal or other defects, as shown by Sharp [8] and in the accompanying illustration.

(*c*) *Inoculation Experiments.*—Most of the observations made on animals inoculated with bacteria recorded in studies of focal infection were reviewed by Holman [1] in 1928. He particularly dealt with the problem of elective localization of bacteria and concluded that the specificity of the bacteria involved has not been proved and that the theory of Rosenow is open to misinterpretation and limited in its practical application. His views have been further supported by the results of studies by Lehmann [9] and by Valentine and Van Meter.[10] Both Schottmüller [11] and Pette [12] advise that Rosenow's views of elective localization of bacteria be not only disregarded but actively combated.

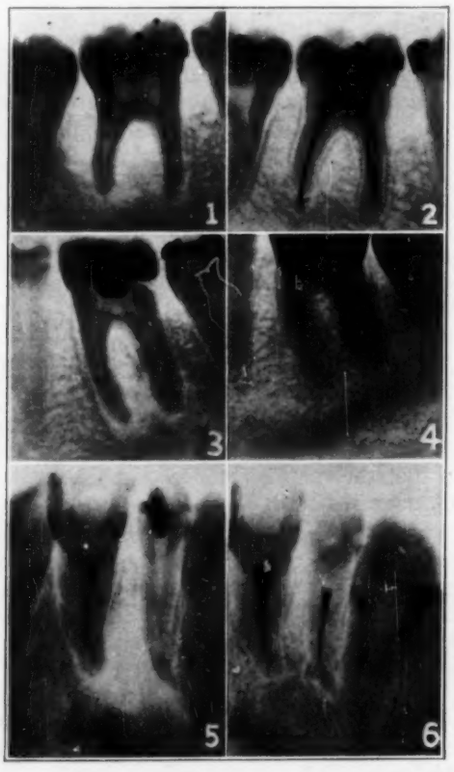
(*d*) *Effect of Tooth Extraction on Systemic Disease.*—Many authorities [13] do not accept the reports of clinical improvement after the extraction of a tooth as proof

From the Department of Medicine, Jefferson Medical College and Hospital.

Owing to lack of space, the bibliography is omitted here. The complete article appears in the authors' reprints.

Read in the Medical Division of the General Scientific Meetings at the Ninetieth Annual Session of the American Medical Association, St. Louis, May 16, 1939.

that infection arising from it was the cause of systemic illness. Many such recoveries are temporary and may result from psychic factors or the shock-like reaction which often follows such operations. No one doubts that prompt improvement occasionally occurs after the extraction of suspected teeth, but Broderick [14] points out that more often the operation does not result in improvement, and this instead of halting the search often leads to further surgical attack on other suspected areas in a vain attempt to eradicate a focus. Many of the best authorities [15] on arthritis oppose the removal of teeth for the treatment or prevention of arthritis. Among Cecil's [16] fifty-two arthritic patients who had some or all of their teeth removed, no benefit occurred in forty-seven, and exacerbations occurred in three. In Bauer's [17] series of 300 cases, those patients who were not subjected to operation have done better than those whose teeth were removed.




1. A girl aged 15, regarded as visceroptotic and anemic, had generalized parodontal disease with loosening of the teeth and a large cavity in the tooth, resulting in death of the pulp with rarefying osteitis of the apical region and parodontosis. 2. Twelve months later, after treatment of the tooth and the use of general hygienic measures, the area of rarefaction has disappeared. 3. A woman aged 42 was told that an abscessed tooth might account for apprehensiveness, depression and vague pains noted during the menopause. She refused to have the suspected tooth extracted. 4. It was treated conservatively, and after eight months another roentgenogram showed restoration. 5. A woman aged 23 had a pyogenic infection of the skin thought to be associated with two pulpless teeth and a large area of rarefaction. 6. The patient refused to allow extraction, and twelve months after treatment of the root canals a second roentgenogram showed regeneration of bone. Roentgenograms by courtesy of Dr. John H. Gunter.

Frankel [18] examined a large group of persons with supposedly good teeth and compared them with persons who had "heavy dentistry." The percentage of disease was no greater in one group than in the other. Broderick [14] examined numbers of patients with arthritis and allergic diseases and found that in most cases all of the teeth had been removed without evident effect on the disease. Kerr [19] believes that the practice of wholesale removal of teeth for suspected foci has been overdone. Leiter [20] states that alleged foci of infection in the teeth have no clearcut relation to nephritis. Levine [21] is unconvinced of the causative relation of infected teeth to rheumatic heart disease. Pemberton [22] states that many persons with arthritis are still undergoing unnecessary mutilation as far as teeth are concerned. Many sound and useful teeth are being extracted, jeopardizing the comfort and health of the victim through failure of satisfactory mastication.[22a] Many ophthalmologists, on the other hand, feel that about one third of cases of iritis are due to focal infection, yet little or no proof exists for this belief, except the improvement which occasionally follows the extraction of teeth. As Verhoeff stated, "Belief in focal infection must be taken like religion, on faith."

We agree with Anderson,[23] of the Dental Study Group at Yale, that practitioners at present have no satisfactory basis for determining whether a tooth is actually harboring infection or not.

*Harmful Effects of Extraction of Teeth.*—The extraction of teeth is not without danger. Since bacteria reside around the gingival margins of all teeth and in the periapical regions of many, there is every reason to suspect that the trauma of operation may force these bacteria into the tissues and blood. The studies of Okell and Elliott [24] are of especial interest in this regard. They made blood cultures immediately after tooth extraction in patients with obviously infected mouths and recovered Streptococcus viridans in 75 per cent of cases and in 34 per cent of those with apparently healthy mouths. Other observations [25] support these. Although bacteremia is usually harmless, many instances of fatal and nonfatal systemic infection and relapse of disease are recorded after the extraction of teeth.[26]

Abscess in the lung occasionally follows the aspiration of blood, tissue or fragments of bone or teeth during or after the extraction of teeth, especially when the patient is anesthetized. According to King and Lord,[27] 12 per cent of a group of 227 cases of lung abscess studied followed extraction of teeth.

## THE TONSILS

In a period between 1928 and 1931, one third of all surgical operations performed in a group of nearly 40,000 cases were for tonsillectomy.[28] Glover,[29] who has made extensive studies of the problem in England, estimates that 200,000 tonsillectomies are performed annually in England and Wales. It may be inferred that in many cases financial considerations play a role since the operation is three times as common among the well-to-do as among the poor. In Collins's [28] study in this country the operation rate was about double in families with large incomes as compared with poor ones. If the procedure is to continue on such a scale there ought to be indisputable evidence of its value to justify it. Such evidence does not exist.[30]

The diseases for which tonsillectomy is especially advised as a preventive or curative measure are "infected tonsils," chronic tonsillitis, rheumatic fever, rheumatoid arthritis, colds, subacute bacterial endocarditis and nephritis. The list of diseases for which the operation has been recommended is long. A few of the more commonly mentioned ones are rheumatic pains, myalgia, neuritis, inflammatory diseases of the eye, sinusitis, heart disease, hypertension, arteriosclerosis, peptic ulcer and ulcerative colitis, practically all of them, it may be pointed out, of unknown origin.

*"Infected Tonsils."*—There are no standards whereby one can judge whether tonsils at any given period of life are normal or not. In the usual sense of the term,

tonsils are regarded as "infected" when they are large, scarred, small, adherent, when the crypts are plugged with caseous material, or when various forms of streptococci can be cultivated from them. These criteria are unreliable. Tonsils such as those described are often present in otherwise healthy and normal people, as well as in persons with every sort of ailment.[31] Kaiser [32] found hemolytic streptococci in 40 per cent of extirpated tonsils, yet no symptoms were present in the children deprived of these tonsils. Streptococcus viridans has often been suspected of pathogenicity, yet Broderick [14] observes that it is a saprophyte found in the mouth within a few hours after birth which remains throughout life. Nonhemolytic streptococci are often found in human tissues post mortem.[33]

According to Long,[34] abscesses of the tonsil were seldom seen histologically in studying 2,000 pairs of extirpated tonsils. Hyperplasia and hypertrophy were common in youth, scarring and atrophy in adult life, and superficial erosions with exudate in the crypts were present in most. Neither Kaiser nor Epstein [35] believes that by inspection a physician can generally tell if a tonsil is chronically infected or not. The physiologic enlargement of tonsils in childhood should not be mistaken for disease.

*Tonsillitis.*—There seems to be general agreement that the tonsils should be extirpated in persons subject to repeated attacks of acute tonsillitis or peritonsillar abscesses. The good results which follow operations for these reasons justify the procedure. The prevention of further attacks of acute tonsillitis in persons who have had attacks of rheumatic fever, nephritis and certain other diseases, it is claimed, diminishes the liability to relapse or recurrence.

*Acute Rheumatic Fever.*—The frequency with which acute rheumatic fever is preceded by an attack of acute hemolytic streptococcus tonsillitis suggests to many an etiologic relationship of the bacterium to rheumatic fever. According to various investigators,[36] however, from 25 to 90 per cent of cases of rheumatic fever or recurrences are preceded by conditions other than acute infections in the respiratory tract or tonsillitis. Tonsillitis and pharyngitis are not consistently followed by recurrence of rheumatic fever in subjects likely to develop the disease.[37] From a statement in the preceding paragraph, tonsillectomy in patients subject to tonsillitis would seem to be indicated as a prophylactic measure, yet Davis [38] does not believe that the tonsils are significant foci of infection for the disease. If they were, he believes, the number of tonsillectomies performed during the past twenty years should have reduced the incidence of rheumatic fever by now. It must be said, however, that other studies [39] have shown a diminished incidence of the disease, but the cause for it is not clear.

Numerous comparisons have been made between groups of children who have tonsils and those who have not. In 1923 Hunt and Osman [40] found that the number of recurrences of rheumatic fever was not reduced by tonsillectomy; in fact, recurrences were more common in those operated on. Other observers also found that recurrences are not reduced by tonsillectomy.[41] Archer [42] found that those patients who had had their tonsils removed were just as apt to have a preceding infection of the respiratory tract as those who still had their tonsils. Some observers suggest that enucleation [43] or incomplete enucleation [44] of the tonsils may even increase the susceptibility of children to rheumatic fever. It is pointed out,[45] however, that one is apt to find a higher incidence of rheumatic fever among tonsillectomized persons because of the routine practice of tonsillectomy for the disease. The studies of Kaiser [46] and of Ash [47] are of particular importance. Both were unable to show a significant reduction of the initial infection, recurrence or subsequent heart disease in tonsillectomized children, although Kaiser advises the operation as a prevention against recurrence because of the slight apparent advantage (2 per cent) possessed by tonsillectomized children.

In the face of much evidence to the contrary, reports [48] occasionally appear claiming beneficial effects from prophylactic tonsillectomy, but it is noteworthy that these studies are insufficiently controlled or not controlled at all.

*Rheumatoid Arthritis.*—More tonsils are extirpated from adults in an attempt to relieve "rheumatic" pains than perhaps for any other reason. This is especially true in the entity called rheumatoid arthritis, for which tonsils are often removed as a matter of routine in spite of the fact that there is no evidence of the specific value of the procedure. There have been no studies made with adequate control, few clinicians are familiar with the natural course of the untreated disease,[49] and but little is said of the actual harm which may result from the operation.

In recent years much evidence has accumulated throwing grave doubt on the practice of removing tonsils or teeth in the hope of preventing the onset or influencing the course of rheumatoid arthritis. Many of those who have had extensive experience with the disease are growing skeptical of the bearing of focal infection on the disease or never did accept the theory. Pemberton's cases did not present much evidence to favor it, for among 400 recovery occurred in 46 per cent without operative attack on supposed foci of infection, while after operation recovery occurred in 16 per cent. As in the case of rheumatic fever, other factors besides infection may precede an acute attack or relapse of rheumatoid arthritis. According to Cobb, Whiting and Bauer,[50] environmental conditions and emotional stress were the apparent incitants in 66 per cent of fifty cases. A statement by the American Committee for the Control of Rheumatism [51] is of interest: "Patients with atrophic (rheumatoid) arthritis are usually poor physical specimens and often underweight. Many of them suffer from cold hands and feet and other vasomotor disturbances long before arthritis makes its appearance." Furthermore, it is important to recall that in rheumatoid arthritis about 25 per cent of patients "recover," 50 per cent improve and 25 per cent get worse no matter what type of treatment is used.[49]

Hench [52] points out the almost uniform absence of localized infection in children with rheumatoid arthritis. Dawson [49] only occasionally found evidence suggestive of the etiologic significance of focal infection and even in these few cases the evidence was far from conclusive. He, Steindler [53] and Wetherby [54] assert that foci of infection are not any more frequently encountered in rheumatoid arthritis than in other diseases or in normal people. Ten per cent of Wetherby's patients had relapses after operation on the teeth or tonsils. Shapiro [55] rarely sees a patient with arthritis who has not already had every accessible so-called focus of infection removed, yet there is no difference in the disease in that group of patients and a group of patients

whose supposed foci of infection have been left untouched. Cecil [56] in 1933 wrote "the keystone of the modern treatment of rheumatoid arthritis is the elimination of infected foci." After longer study he and Angevine (1938) stated [16] that in no instance was the course of the disease altered or the patient cured when supposed foci were removed. Tonsillectomy had no beneficial effect in eighty-six cases and caused severe exacerbation in two and temporary improvement in four. Cecil now believes that focal infection plays a comparatively unimportant role in the disease. Bauer [57] is convinced that focal infections play no role in the causation of rheumatoid arthritis. McCollum [58] noted no benefit in seventy patients after tonsillectomy as compared with patients not operated on. Hurd's [59] experience was similar, but he incriminated the nasal sinuses instead of the tonsils. Others minimize the importance of the sinuses as foci of infection.[59a]

From the authoritative opinions given it is obvious that at present no final conclusions can be formed as to the relation of focal infections to rheumatoid arthritis.

*Other Conditions.*—Kaiser [60] in a ten year follow-up study on several thousand children concluded that the incidence of acute colds, otitis media, bronchitis and pneumonia is not lessened by tonsillectomy; in fact, certain conditions occurred more often after tonsillectomy. Complaints of frequent colds, hoarseness, attacks of fever, nosebleed or headaches were not improved by the procedure. The outstanding benefit was the reduction of the incidence of tonsillitis and sore throats, which may indirectly reduce the incidence of rheumatic fever, nephritis and arthritis. Cunningham [61] in a study of 14,000 students found less evidence of damage to the mitral valve among students with normal tonsils than among those whose tonsils were absent or pathologic. The group without tonsils had history of a higher incidence of all illnesses and operations than did those with normal or pathologic tonsils, but this may indicate only that those who are often ill are most frequently operated on. There was little or no difference in the incidence of measles, mumps, scarlet fever, diphtheria, chickenpox, whooping cough, rheumatism, pneumonia, pleurisy and chronic colds whether the tonsils were normal or pathologic. In other groups,[62] students with nasal obstruction or "infected" tonsils were not especially susceptible to colds, and tonsillectomy had no influence on the incidence of scarlet fever.[43] Anderson's [63] experience in life insurance examinations shows that there is no appreciable difference in mortality from heart disease in persons with or without their tonsils.

In an investigation of 30,000 school children, a British commission [64] found that the incidence of colds, coughs and sore throats in those with or without their tonsils did not differ, yet about one half of all children examined had had their tonsils removed. They conclude "that there is a tendency for the operation to be performed as a routine prophylactic ritual for no particular reason and with no particular result." They have grave doubts whether the majority of tonsillectomies performed today are the result of true discrimination rather than of routine ritual. Numerous other observers [65] have likewise expressed skepticism as to the results obtained from tonsillectomy.

According to Glover, Ash's vigorous campaign in Derbyshire reduced the number of tonsillectomies from 1,187 in 1932 to 164 in 1937, yet no increase in the incidence of sore throats, colds, deafness or otitis media was noted. Anderson [66] replies that the reduction in number of operations on the throat in certain communities reported by Glover is brought about because of the diminution of throat ailments calling for operative treatment. If tonsillectomy is harmful, a reduction of unnecessary operation he argues should result in improved child health. Anderson also suggests that the variation of number of tonsillectomies performed in a given locality from year to year reflects a genuine variation of the need for the operation. One is at a loss, however, to know what changing indications may arise from year to year to control the need for tonsillectomy.

Ellis and Russell [67] studied 4,000 Basque children moved to England to escape the Spanish War. Less than 2 per cent of these children had had their tonsils removed. Many tonsils were as large as walnuts but the incidence of cervical adenitis and otorrhea was only 0.4 per cent. The incidence of obvious infection or obstruction of the respiratory tract was low as compared with British children who had had their tonsils excised.

*Harmful Effects of Tonsillectomy.*—It is often stated [68] or implied that tonsillectomy is a harmless and safe procedure. This is not always the case.[69] It is true that published statistics often show a surprisingly low mortality rate as a direct result of the operation, but in many instances the patients are not followed for more than a few days after operation. It is known [70] that many cases of pulmonary abscess never come to the knowledge of the surgeon; some of them are recognized months later by another physician. Published statistics usually originate from large well equipped hospitals or from the hands of surgical experts. The final conclusions no doubt would be far different if one could learn the results of tonsillectomies performed by novices or by the inexpert. It is not uncommon for interns to perform the operation during the rush period on "tonsil days" in certain hospitals. Furthermore, although it is often asserted that the death rate from anesthesia during tonsillectomy is exceedingly low, in 1924 Collins and Sydenstricker [45] found that among children between the ages of 5 and 14 in the registration area there were forty deaths from anesthetics, and of these 57 per cent were given for tonsillectomy. In the registration area of the United States in 1924 there were 474 deaths from anesthetics, 16 per cent of which were given for tonsil and adenoid operations. The subsequent years have no doubt brought about improvements in technic to reduce these accidents but the danger remains. The Registrar-General's Statistical Review from England for the years 1931 to 1935 gives enlarged tonsils and adenoids as the cause of death of sixty children, while 513 deaths resulted from tonsillectomy. It is estimated that eighty-five deaths occur annually as a result of tonsillectomy in children under 15.[71]

In discussing the etiology of pulmonary abscess, Norris and Landis [72] list operations in the nose and throat under general anesthesia, particularly tonsillectomy, as first among the most frequent causes. From 40 to 60 per cent of lung abscesses follow tonsillectomy and other oral operations.[73]

Tonsillectomy, like extraction of teeth, may lead to temporary bacteremia,[74] and in certain cases to subacute bacterial endocarditis.[75] Nesbit [76] recorded the development of complications in 7.5 per cent of children operated on as outpatients and in 2.2 per cent of private

patients. Numbers of cases of poliomyelitis [77] have developed shortly after tonsillectomy. Numerous other conditions, diseases and relapses may be precipitated by tonsillectomy.[78]

COMMENT

There is much opposition to the routine practice of removing teeth and tonsils as foci of infection to influence general symptoms. It is clear that the concept of focal infection, in this respect, is not an established fact as it is often claimed or believed to be.[79] Nevertheless the theory is still strongly defended by many perhaps because, as Kant says, "certain things repugnant to the reason find acceptance among rational people simply because they are universally spoken of."

Pepper [80] as early as 1926 thought that the theory was being carried too far and in its pursuit enormous numbers of teeth and tonsils were sacrificed by expensive and sometimes dangerous procedures. He wondered whether the surgical accessibility of teeth and tonsils was not partly to blame for the tendency. Hamman [81] stated that never before, at least in modern times, has a theory of disease so captured the imagination of the profession. Kinsella [82] does not believe that any secure evidence exists to associate infected teeth or tonsils with focal infections such as chronic rheumatism. Bauer [83] recognizes no systemic disease caused by focal infection in the sense of the term used here except for an occasional septicemia resulting from complications which might follow a periapical abscess, particularly after extraction of a tooth. Because the etiology of a certain disease is unknown is no reason why the cause should be ascribed to focal infection. Cecil and Angevine [16] say that focal infection is a splendid example of a plausible medical theory which is in danger of being converted by its too enthusiastic supporters into the status of an accepted fact. The time has come, they believe, for a complete revaluation of the theory of focal infection. Bloomfield [84] regards the procedure to be now hardly more than a gesture or the remnant of a habit which enables one to do something in chronic cases in which there is so little to do.

It is generally admitted that occasional improvement does occur after operation on supposed infected areas, and many physicians are able to recite their own experiences of prompt relief of this or that complaint after the extraction of a tooth or after tonsillectomy. Such examples suggest, but by no means prove, an etiologic relationship. One can never be certain whether recoveries, especially spectacular ones, occurring often a few hours after operation are not partly due to faith, chance, coincidence of spontaneous cure or to nonspecific factors, or whether the same degree of improvement might not have been brought about by less drastic or less dangerous methods. The old dictum "after it, therefore because of it" should not mislead one. It is probable that the occasional recoveries which occur are equaled or even outnumbered by instances of immediate or delayed harm which may follow operative procedures in the form of hemorrhage, septicemia, lung abscess, other grave systemic disease and even death, as discussed previously in this paper. One more easily remembers prompt successes than delayed failures.

There are few reliable criteria for deciding whether or not teeth or tonsils are chronically infected and fewer to prove their relationship to systemic disease. Without local pain, tenderness, swelling, sinus formation or lymph node swelling, a roentgenogram alone cannot be relied on to diagnose periapical abscess or periodontitis. Decreased density about the root of a tooth is no more proof of infection there than is increased density in the case of the nasal sinuses. The cultivation of bacteria from teeth gives little information, since the bacteria usually present have no proved relation to the diseases usually dealt with in this regard.

As far as the tonsils are concerned it is equally difficult on inspection to decide whether they are "infected." Ragged or enlarged tonsils, the expression of "pus" from the crypts and the cultivation of bacteria from them do not necessarily indicate inflammation. Bacteria can always be found on the mucous membranes, and the cheesy material usually found in the crypts is pus only to the extent that it is liquid and composed of cell detritus, desquamated epithelium, leukocytes and bacteria. It is no more the result of inflammation than other similar cheesy material which may be scraped from the crypts of other less accessible portions of the gastrointestinal mucosa. It is just as unimportant in most instances to consider that the tonsils are infected as to recall that the colon is swarming with bacteria.[31]

We believe that the chief criteria for a diagnosis of chronically infected tonsils are (*a*) persistent redness of the tonsils and adjacent membranes and exacerbations of acute inflammation often with pain or discomfort on swallowing with or without regional lymph node swelling and tenderness, (*b*) systemic signs and symptoms such as fever, leukocytosis and rapid red blood cell sedimentation, or (*c*) swelling, pain or tenderness of the lymph nodes which receive tonsillar lymph. In other words there ought to be some clinical or other evidence of actual inflammation of the tonsils before they are regarded as infected.

Even if the tonsils were implicated in the problem of focal infection, it is difficult to see why other lymphoid tissue in the nasopharynx, trachea, bronchi, lungs, intestine, appendix, gallbladder, cervix and elsewhere should not also be involved, yet efforts at removal are almost solely confined to accessible tonsil and adenoid tissue. Several other pertinent questions may be raised.

(*a*) Unless some peculiar relationship of chronically infected teeth or tonsils pertains to systemic disease there seems to be, with few exceptions, as little justification for their removal as there is in the case of the primary focus of chronic tularemia, glanders, anthrax, tuberculosis and of other specific chronic infections with which surgeons have long since ceased to tamper. (*b*) If the probable incidence of general or systemic infection resulting from acute or chronic infections of the teeth or tonsils was no greater than similar infections resulting from urethral gonorrhea, for example, less than 1 per cent of patients would be afflicted. Furthermore, it is not generally accepted that Streptococcus viridans, the bacterium most frequently incriminated, has anything to do with the conditions usually discussed in this respect, excepting subacute bacterial endocarditis. (*c*) If, as some would have us believe, chronically infected teeth or tonsils are so often accompanied by evidence of systemic localization and disease, why does not similar disease more frequently accompany or follow other instances of chronic focal infection with enclosed pus such as, for example, chronic bronchiectasis, chronic lung abscess or chronic infections of bones? (*d*) It may also be pointed out that many patients with chronic arthritis, "rheumatic

pains," nephritis or acute rheumatic fever do not have demonstrable areas of focal infection, and that conversely many persons with known chronic periapical abscesses or periodontitis, repeated attacks of tonsillitis or other focal infections do not have systemic disease. There is no constancy of relationship.

It has already been observed that many patients with arthritis or other rheumatic-like pains are often subnormal to begin with or become so from the effects of chronic illness.[85] In such persons the teeth,[86] the tonsils and perhaps many other tissues and organs are adversely affected or become infected or at least infected appearing as a result of diminished resistance. Such local evidence of disease often disappears if recovery from the general disease ensues. The tonsils, particularly in malnourished, underweight or otherwise subnormal children, probably would become "normal" in appearance spontaneously if the general health were improved by hygienic measures.

### CONCLUSIONS

A review of the case against routine extraction of teeth and tonsillectomy for the purpose of preventing or curing systemic disease shows that the experience of twenty-five years has not justified the practice in the minds of many who have given the matter careful thought. The reasons advanced in favor of the procedure lack controlled clinical and experimental support. By comparing the occasional benefit obtained with the dangers incident to operation, one is led to recommend the procedure only in exceptional cases when evidence of actual local disease is present and its relation to remote or systemic disease probable.

If abscess or chronic infection around a tooth is present with reasonable certainty or if the tonsils are actually infected and give rise to repeated attacks of illness, there is no question that surgical measures are necessary in treatment of the local condition. But, in the light of present knowledge, the removal of such local infections in the hope of influencing remote or general symptoms and disease must still be regarded as an experimental procedure not devoid of hazard.

It may be said, therefore, that: (*a*) The theory of focal infection, in the sense of the term used here, has not been proved, (*b*) the infectious agents involved are unknown, (*c*) large groups of persons whose tonsils are present are no worse than those whose tonsils are out, (*d*) patients whose teeth or tonsils are removed often continue to suffer from the original disease for which they were removed, (*e*) beneficial effects can seldom be ascribed to surgical procedures alone, (*f*) beneficial effects which occasionally occur after surgical measures are often outweighed by harmful effects or no effect at all, and (*g*) many suggestive foci of infection heal after recovery from systemic disease, or when the general health is improved with hygienic and dietary measures.

**The First and Last Must Be Clinical.**—Knowledge that is to be applied usefully to the health of mankind will almost always come by a series of steps, the first of which is the recognition of the human need, the last of which is the application of a test directly to the human problem. It is in the nature of things, however many steps may intervene, that the first and last must be clinical; as it is also in the nature of things that almost all important physiological discoveries that are immediately applicable to the treatment of disease have their original source in clinical observation.—Lewis, Sir Thomas: Research in Medicine and Other Addresses, London, H. K. Lewis & Co., Ltd., 1939.

# TREATMENT OF URETERAL CALCULUS

## WITH PARTICULAR REFERENCE TO TRANSURETHRAL MANIPULATION

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No method has yet been developed to anticipate and prevent the formation of a ureteral calculus. Despite the present knowledge of the chemistry of urinary excretion and of methods of preventing the reformation of stones, the urologist is still keenly cognizant of the lack of positive and practical data pertaining to their causation. The importance of frequent contributions to the problem of causation is apparent, for as a result of these the solution may suddenly appear and only in its simplicity cause astonishment.

In recent years the most popular hypothesis of the causation of stone in the urinary tract includes hyperparathyroidism, vitamin deficiency, infection of the urinary tract by urea-splitting organisms, urinary stasis due to a variety of causes, and local disease involving the renal papillae. The validity of any of these being an etiologic factor in rare cases is indisputable but for the large majority of cases there is still no satisfactory explanation. The unknown factor remains to be found and the majority of urologists, while hoping for its discovery, will concern themselves in the meantime with what to do about a urinary calculus after it has formed.

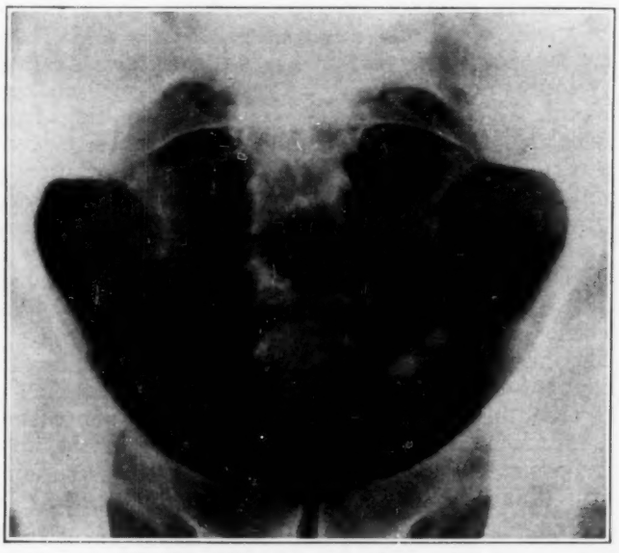

Fig. 1.—A group of ureteral calculi in the lower end of the left ureter; they were removed by transurethral manipulation.

In 1930 Bumpus and Thompson [1] reported a series of 1,001 cases of ureteral calculus. That article called attention to the importance of accurate diagnosis in order to avoid unnecessary operations, particularly appendectomy, commented on the opinions of various authorities on transurethral manipulation and reported the results of transurethral treatment in several hundred cases.

From the Section on Urology, the Mayo Clinic.
Read before the Section on Urology at the Ninetieth Annual Session of the American Medical Association, St. Louis, May 19, 1939.

1. Bumpus, H. C., Jr., and Thompson, G. J.: Stones in the Ureter, Surg., Gynec. & Obst. **50**: 106-109 (Jan.) 1930.

It is our present purpose to review the subject again and report the experiences encountered and results obtained in a series of 361 cases of ureteral calculus in which transurethral manipulation was done during the interval from Jan. 1, 1930, to Dec. 31, 1938, inclusive. This number, of course, does not include all the cases of ureteral calculus seen during that interval of time. An almost equal number were treated expectantly either because of the small size of the stone, the lack of symptoms, the existence of inoperable malignant neoplasms in other organs or the apparent possession of a peculiar ability to pass stones spontaneously, or because, for fancied physical, social, economic and sometimes undisclosed reasons, the patient refused to follow advice given. For an almost identical number of cases ureterolithotomy was advised rather than transurethral manipulation. Open operation was advised in these several hundred cases for many reasons, including the size of the stone, its position in the ureter, the duration of symptoms, the mental attitude of the patient, the amount of time available for removal of the stone, the condition of the kidney and other reasons too numerous to mention.

Suffice to say that each case of ureteral calculus presents a different problem and if the patient is to be served best no hard and fast rules can be laid down, though there probably exist certain general principles on which advice should be based. It is apparent therefore that the results reported in any series of cases are subject to the criticism that they are not truly representative of results which might be obtained in some other locality by somewhat altered methods of treatment. With this there can be no disagreement.

The series of 361 cases considered in this article is composed of all cases in which any transurethral manipulation of a ureteral stone was done with the exception of simple diagnostic ureteral catheterization. It is well known that many patients will pass a ureteral calculus spontaneously after its axis has been turned by ureteral catheterization. We have not included such cases in this series. It should be emphasized that probably the majority of ureteral calculi are passed without the aid of a urologist, for many of our patients reported passing several to a number "too many to count" before one finally formed which stuck in its transit through the ureter and caused the visit to the clinic. It is therefore quite apparent that, aside from relieving pain with the proper sedatives or narcotics, the physician called on to treat a patient suffering with a ureteral calculus has no grave emergency on his hands in an overwhelming majority of instances. The existence of anuria and advanced uremia is probably the only exception to this general rule.

We shall not try to discuss the various interesting phases of the problem of which method of treatment should be selected for any particular group of cases of ureteral calculus. Each case presents an individual problem and without doubt different observers would vary in their opinion of the proper form of treatment.

Probably the size of the ureteral calculus is of most importance in any given case, though individuals will be encountered who will present for inspection quite large calculi which they have passed spontaneously. Of the 361 cases in which transurethral methods of treatment were done, in 28 per cent there were stones which measured 5 mm. or less in their greatest diameter, in 19 per cent the diameter varied between 5 and 10 mm., in 46 per cent from 1 cm. to 2 cm. and in 2 per cent slightly above 2 cm., while in 5 per cent the size was unfortunately not recorded. The review of these cases emphasizes the opinion expressed[2] before: that of greater importance than the size of the stone, when considering transurethral methods of removal, is the size of the ureter in which it lies. It is a relatively easy matter to pass catheters or extractors alongside a stone contained in a large ureter and often an impossibility to pass a catheter alongside a tiny stone in an undilated ureter. Things which prevent ready access to the ureter, such as an enlarged prostate gland, a fixed

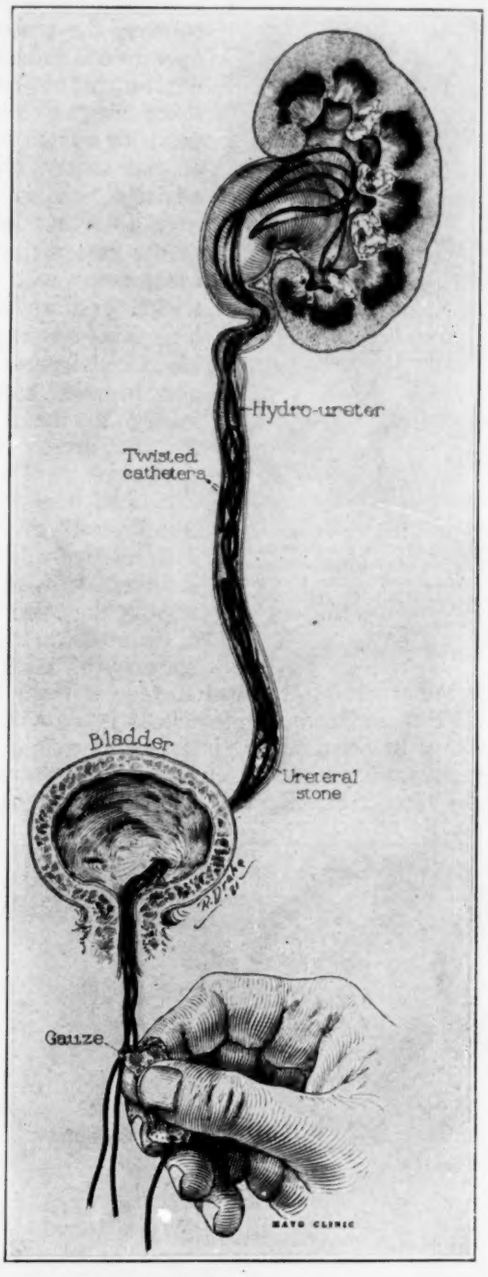


Fig. 2.—Multiple catheter method of extraction of ureteral calculus. The catheters are passed alongside the stone and then twisted, causing them to coil above and around the calculus.

hip, a marked urethral stricture, pelvic tumors, uterine fibroids or pregnancy, might affect a decision to manipulate a stone even though on the basis of size of the calculus alone the case might seem a suitable one for this procedure.

The position of the stone is of some importance in considering the advisability of transurethral manipula-

2. Thompson, G. J.: Stone in the Ureter: Methods of Diagnosis and Transvesical Removal, Wisconsin M. J. **35**: 802-804 (Oct.) 1936.

tion. As a general rule it is wise to let the stone descend to the lower third of the ureter, though we have in some instances removed stones from the ureteropelvic juncture and from within the renal pelvis. With few exceptions, if the patient is unwilling to wait for the stone to descend, a ureterolithotomy done through a lumbar incision is a wiser choice than transurethral manipulation. If the stone is impacted in the upper third of the ureter and operation is refused, the dislodgment of the stone upward into the pelvis or dilated portion of the ureter may be advisable. It is, however, a striking fact that in the vast majority of cases urine will finally trickle past an irregularity in an impacted stone and in that manner prevent extensive injury to the kidney. As the ureter dilates, the stone will finally slip into the ureteral spindle and eventually with relatively little pain involved will find its way to the lower third of the ureter in the great majority of cases.

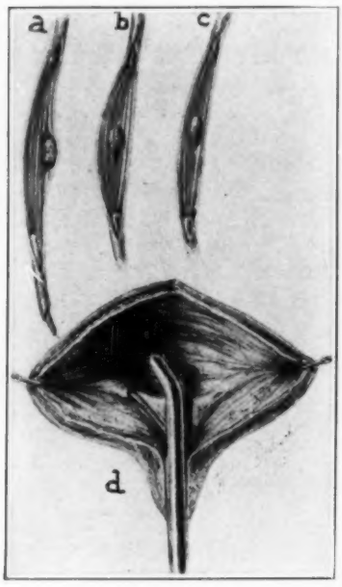


Fig. 3.—The Councill extractor; *a*, extractor alongside the calculus; *b*, the wires are expanded, thus enmeshing the calculus; *c*, the wires are contracted around the calculus. (From Councill, W. A.: A New Ureteral Stone Extractor and Dilator, J. A. M. A. **86:** 1907-1908 [June 19] 1926.)

After the stone has reached the lower third of the ureter and caused some ureterectasis it may lie there for weeks or months, causing intermittent colic of varying severity and yet never engage in the intramural portion of the ureter. Beyond any doubt the most difficult portion of the ureter for a stone to traverse is that few centimeters near and in the wall of the bladder.

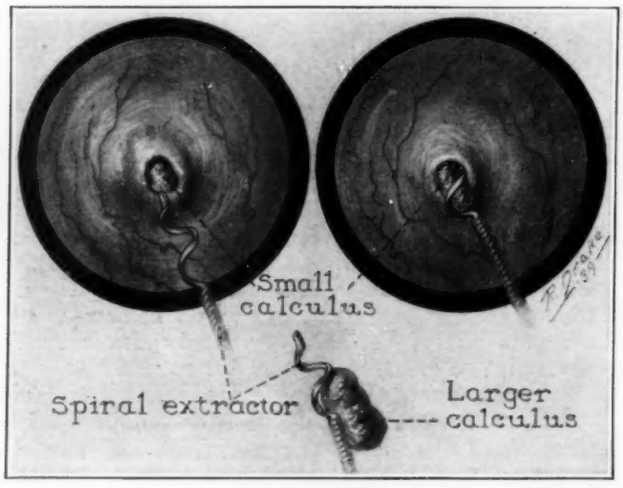


Fig. 4.—The spiral dislodger is effective for small calculi impacted in the ureteral meatus. Sometimes larger calculi can be engaged well within the ureter.

When the stone is situated just above or within the bladder wall the chances of removing it by manipulation are usually good (fig. 1). In most instances when the stone is located in the upper two thirds of the ureter it is best to rely on its spontaneous descent rather than try transurethral manipulation. The passage of a catheter or injection of oil into the ureter occasionally will speed the descent of the stone but there is some risk of introducing infection. Therefore, as was true in many of the cases seen at the Mayo Clinic, ureterolithotomy is preferable to spending two or three or more weeks waiting for the stone to get down to a position favorable for transurethral manipulation. During the interval before stated, 392 ureterolithotomies were performed, twenty-five of these being done after transurethral methods had failed. However, in fairness to the transurethral method it should be stated that twenty of the twenty-five patients elected to proceed with the operation either the same day on which transurethral methods were tried or within a few days thereafter. The other five patients were subjected to ureterolithotomy after there was little or no hope of removal of the stone by the transurethral route.

We are agreed that transurethral manipulation of a ureteral calculus either with multiple catheters or with any of the various extractors is a hospital procedure and should never be done in an office. Ureteral catheterization, injection of oil and dilation of the ureter with small bulbs are permissible office methods but we seldom employ them and prefer manipulation in the hospital.

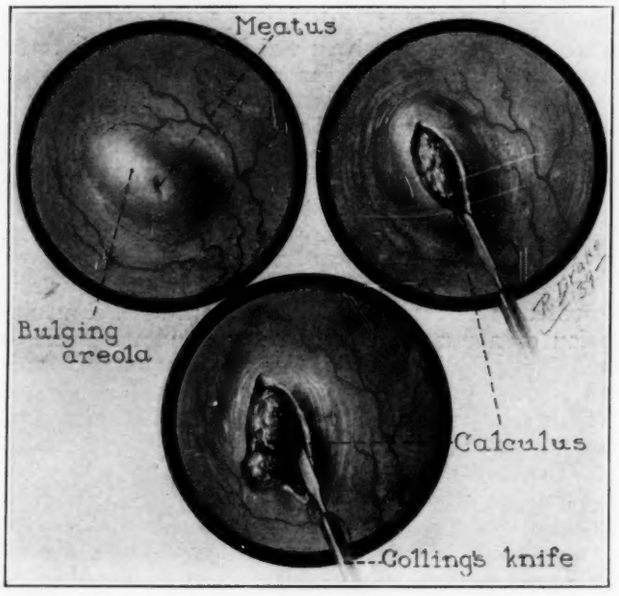


Fig. 5.—Method of exposing a ureteral calculus impacted in the lower end of the ureter by incision with the electric knife.

The use of an anesthetic such as pentothal sodium given intravenously is wise practice, for ureteral spasm which will defeat one's efforts will generally develop if an attempt is made without an anesthetic.

Prior to several years ago the multiple catheter method (fig. 2) was generally employed at the Mayo Clinic in the majority of cases. However, in recent years the Councill extractor (fig. 3) has been the favorite instrument, while the Johnson extractor of somewhat similar design has during the last year been used in an increasing number of cases. The spiral stone dislodger is particularly effective for small stones impacted in the ureteral meatus (fig. 4). Larger stones lying within the bladder wall can be exposed and dislodged nicely with the Collings knife (fig. 5). Other miscellaneous extractors were used in a few cases.

At this point it seems wise to state that even the most experienced cystoscopist should be extremely

gentle with any of these extractors and further, and what seems most important, efforts to remove a stone with them should not be continued for more than a few minutes. We employ the direct vision Braasch cystoscope, through which the extractor can be pushed directly and any resistance to the passage of the instrument can be easily detected by tactile sense. The McCarthy panendoscope is also an excellent instrument for such procedures. Operating cystoscopes equipped with levers, elevators or directors of any kind are not as good as the two first-mentioned instruments because the tactile sense is interfered with and unusual force may unwittingly be applied. If the ureter is large enough the extractor will slip alongside the stone and engage it on the first or second attempt. Unless it does so immediately we believe it is better to withdraw the extractor and insert two or more ureteral catheters in order to produce ureteral dilatation. These catheters are left inlying for two days, at the end of which time manipulation with the extractor will often succeed. Ureteral meatotomy is not often necessary, for the ureteral meatus can usually be readily dilated with the extractor.

Fig. 6.—Calculus enmeshed within the Councill extractor. A urethral catheter has been inserted to drain the urine from the bladder, thus preventing reflux of urine into the ureter, which might occur if the patient should be permitted to void.

In a rare case the extractor will engage the stone but it will be difficult or impossible to withdraw it immediately. In such cases it is better to leave the instrument inlying for twenty-four hours, at the end of which time it can according to our experience be easily withdrawn (fig. 6).

After ureteral stone extraction of any sort we pass at least one catheter and generally two of them into the ureter in order to detect any small fragments or a second unsuspected small stone. These can generally be teased out of the ureter by slight traction under vision. The catheters are then passed as far as the renal pelvis and tied in along with a urethral catheter which drains the bladder. These are all left in for from forty-eight to seventy-two hours in order to obviate obstruction of the ureter by edema resulting from the manipulation. We believe this is an important point in avoiding colicky pain, fever, chills, and so on.

It is well to make a postoperative roentgenogram to prove that the stone has been removed. This should be shown to the patient and compared in his presence with the preoperative film, for it is sometimes difficult to convince the occasional patient in whose same ureter another stone forms that the original calculus was properly removed. If the roentgenograms have been kept on file, one has conclusive evidence available.

## RESULTS

Of the 361 patients who underwent transurethral manipulation the entire stone was withdrawn from the ureter and presented to 246 when they awoke from the anesthetic (fig. 7). In twelve other cases the largest part of the stone was likewise withdrawn but a small fragment which passed later was visible in the postoperative roentgenogram. In 103 cases the stone was not obtained at the time of manipulation. In thirty-five of these cases the stone was passed within a few days and in twenty-eight more it was passed within a period of several weeks. During this time the great majority of patients were quite comfortable and when the stone finally passed the pain involved was as a rule less than that which was experienced prior to manipulation. Thus it is evident that the procedure dilated the ureter and assisted passage of the stone. In nine other cases it seems likely that the stone passed, as the patients thought it did but were unable to recover it for close inspection; since that time they have been free from all pain. In four cases the evidence seems to point to failure because, when last heard from, the patient stated that to his knowledge the stone had not passed. In the remaining twenty-seven cases ureterolithotomy was done after manipulation had failed, in two of these after the patient had left the Mayo Clinic.

Thus in a total of 361 cases, in 330 cases, or 91.4 per cent, the results of manipulation can be classed as successful; in four cases, or 1.1 per cent, the method was a complete failure, and in twenty-seven cases, or 7.5 per cent, ureterolithotomy, elective or otherwise, was performed following attempted manipulation. The first attempt to obtain the stone was successful in a high percentage of the cases. In the entire series of 361 cases a total of 416 attempts were made or an average of 1.26 manipulations for each of the 330 successful cases.

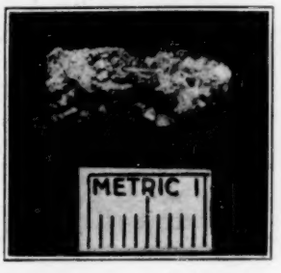


Fig. 7.—A calculus which was removed at the time of manipulation.

It is of course a great satisfaction to the patient to be given the stone when he awakes from the anesthetic, but trying to attain the end should not inveigle the urologist into harsh manipulative efforts. A better course if the extraction proves difficult is to depend on the dilatation produced and allow the patient a reasonable interval, as long as he is comfortable, in which to try to pass the stone.

## REACTION TO MANIPULATION

Pain will almost never be experienced if, as stated in a preceding section, catheters are left inlying in the

ureter after manipulation. Following their removal, or even before in rare cases, fever may develop. Only rarely (2.7 per cent of the 361 cases) does this become alarming, causing one to wonder whether infection has developed in the renal pelvis or renal cortex.

These patients must be carefully nursed and sometimes it is wise to reinsert ureteral catheters. In several cases such as this, from 50 to 75 mg. of mercurochrome diluted in 500 cc. of physiologic solution of sodium chloride given intravenously proved remarkably beneficial. Reactions to manipulation classed as moderate to mild occurred in thirty-two cases, or 8.8 per cent. In none of these did the fever reach a degree which caused much concern and in most instances the temperature returned to normal in a day or two. In the remaining cases, or 88.5 per cent, there was no reaction whatever after the manipulation of the stone except possibly a little burning on urination and a slight frequency for a few days.

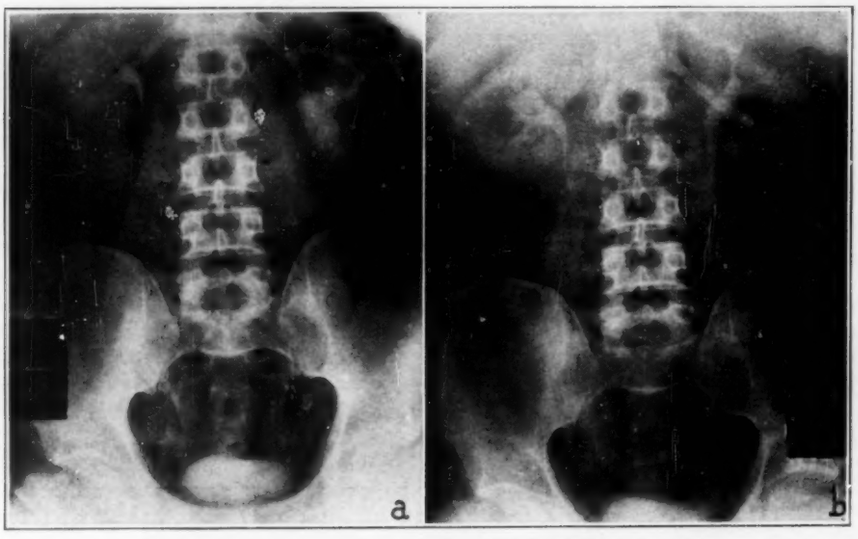


Fig. 8.—*a*, Preoperative excretory urogram showing failure of the left kidney to excrete the urographic mediums; note the calculus at the left ureterovesical juncture; *b*, postoperative excretory urogram made only a few hours after transurethral manipulation, revealing a normal-appearing left kidney, there being no dilatation of the renal pelvis or calices and only slight dilatation of the ureter.

We believe that the use of catheters inlying in the ureter and then proper care are most important in avoiding febrile reaction. Strictly aseptic precautions should be instituted. If possible, irrigation of the catheters should be avoided, being used only when the catheters plug and cannot be opened again by ordinary aspiration with a syringe. A good method of keeping the free ends of the ureteral catheters sterile is to pass them through the holes in the nipple of an infant's nursing bottle; the bottle is small enough so that it will be necessary, if the bed is to be kept dry, to inspect it every hour or two, thus insuring the patient good attention by the hospital staff.

Severe complications such as periureteritis, thrombophlebitis, pulmonary infarcts and pyelonephritis of more than a few days' duration were exceptionally rare, being confined to but a few patients who weathered the storm after appropriate treatment was instituted.

### PERIOD OF HOSPITALIZATION

Of great importance to the patient is the hospital cost involved in getting rid of the offending ureteral calculus. In those instances in which the initial attempt at extraction has failed and additional transurethral manipulation is advised the time consumed will soon equal that which would be required for convalescence from a ureterolithotomy. The anticipated disappointment of the patient over the failure to remove the stone should not influence the cystoscopist to the point of persisting with efforts at removal which might result in ureteral injury. Extreme gentleness in the insertion of extractors is essential if complications are to be avoided. The patient should be told at the outset that open surgical operation may be necessary after manipulation has been attempted. Unless he consents to this it is probably better to let him try to pass the stone without cystoscopic aid. Generally after a few colics he will be willing to cooperate.

The large majority of our patients spent only a few days in the hospital. It is generally our practice to keep the catheters which were passed into the ureter after manipulation in place for forty-eight hours and following their removal we believe it is best to observe the patient closely for another twenty-four hours or even forty-eight hours. To some urologists this may seem overcautious. In our experience, however, the patient appreciates the precaution and willingly spends the time in the hospital. In 75 per cent of the cases the interval of hospitalization was not more than one week and in most of these it was four days or less. In another 20 per cent up to an additional week of hospitalization was required and the other 5 per cent were unfortunate enough to be in the hospital longer than two weeks. One patient who required abdominal incision to drain a periureteritis spent four weeks in the hospital. The longest duration of confinement was that of one elderly patient in whom thrombophlebitis and recurring pulmonary infarcts developed; a total of sixty-three days' hospitalization was required in this case. The manipulation in this case was quite simple and we believe the complication which occurred cannot be attributed to any fault in the method.

### RETURN OF RENAL FUNCTION

We believe attention should again be called to the fact that renal function is often temporarily much reduced in cases of ureteral calculus in which the stone is tightly impacted. At the time of acute colic and for an interval thereafter an excretory urogram will entirely fail to delineate the renal pelvis and calices. The erroneous conclusion might be drawn that the kidney is entirely functionless and that nephrectomy is therefore the procedure of choice. Practically all urologists have encountered such cases and are aware that following cystoscopic or open surgical removal of the impacted calculus renal function is quickly resumed and in many cases there is practically no evidence of hydronephrosis (fig. 8). The kidney in such cases must temporarily stop its physiologic activity. It should be emphasized that the excretory urogram is only one link in the chain of evidence in any urologic disorder; particularly is this true in ureteral calculous disease and operative treatment should not be instituted until a competent urologist has reviewed the excretory urogram. Unless this practice is adhered to, many kidneys will be unnecessarily sacrificed.

Shortly after the passage of a ureteral calculus, renal function is often such that an excretory urogram will be outlined on the involved side in only those films made from thirty to forty-five minutes after intravenous injection of the mediums. The calices may be dilated to several times normal size but after a few weeks another urogram will usually disclose normal size calices which are visualized in a normal interval after injection of the mediums. Here too the available data must be carefully considered. The finding of a low-grade fever in such a case coupled with the early urographic evidence might be construed as sufficient indication for nephrectomy, when as a matter of fact such a kidney will invariably recover.

### MORTALITY

In this series of 361 cases in which transurethral manipulation was done there were no deaths which could be directly attributed to the methods employed. The only death which occurred was that in one case in which transurethral methods were unsuccessful and ureterolithotomy was done immediately. This patient seemed, during the second week of convalescence, well on the way to recovery when a massive pulmonary embolism occurred and she died within a few minutes.

### CONCLUSIONS

1. Ureteral calculi will pass spontaneously in about one third of the total number of cases encountered; in approximately the same number transurethral methods of extraction are justified and advisable; for the other third ureterolithotomy or other open surgical methods seem best.
2. Ureteral stone extractors, if carefully used, will be of distinct aid in removing the stone at the time of manipulation.
3. If the case is suitable for the use of a metallic stone extractor, this instrument will readily enter the ureter and quickly engage the stone. Repeated attempts to engage the stone should be avoided, for they will usually result in ureteral trauma and lead to complications.
4. The morbidity following proper transurethral methods is slight and mortality is extremely low.
5. In the large majority of cases the opinion of a urologist should be obtained before a decision is made as to the course of treatment which should be instituted for a patient with ureteral calculus.

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## ABSTRACT OF DISCUSSION

DR. E. P. ALYEA, Durham, N. C.: Cystoscopic removal of ureteral calculi has always been a subject of great interest to urologists. Many instruments have been invented and various technics described, all of them based on the principles of dilation, lubrication or relaxation of the ureter or on the dislocation, grasping or crushing of the stone. I feel that overemphasis has been placed on the invention of special instruments for the extraction of ureteral calculi and that perhaps the simplest, safest and most efficient methods have been overlooked. I am of the opinion that the multiple catheter method is both efficient and safe. This includes the principles of dilation, lubrication of the ureter and the grasping of the stone in the mesh of twisted catheters. To this technic I added the idea of continuous constant traction on the engaged calculus followed by relaxation of the ureter by spinal anesthesia at the time of extraction. Once the stone is caught, constant traction is obtained by means of rubber bands taped to the twisted catheters and attached to a perineal traction cage. Olive oil is injected through the catheters several times and, if the stone has not come out in twelve to twenty-four hours, spinal anesthesia is administered and the catheters are withdrawn. Many of the larger stones have been extracted in this manner. An objection often raised to cystoscopic removal is that the calculus remaining in the lower part of the ureter for some time causes irreparable damage to the kidney. There have been many cases in our clinic to disprove this contention. In a series of 400 ureteral stones in our clinic, 71 per cent were removed cystoscopically and the mortality was 0 in these 296 cases. We have used the various ureteral scissors, fulguration fins and so on for cutting the ureteral meatus. The Collings knife used through a panendoscope probably is the most satisfactory. It is introduced and turned so that the blade points anteriorly. After the intravesical ureter has been elevated with the blade, the surgical cutting current is touched and the knife cuts through quickly. One is sure not to cut too deeply with this method. It is remarkable how a meatotomy may start stones moving even though they may be 2 or 3 cm. from this area. I have seen this occur many times.

DR. H. C. BUMPUS JR., Pasadena, Calif.: The question of what method shall be used in the treatment of calculi in the ureter has much in common with the question of what method shall be employed in treating benign prostatic hypertrophy. In both conditions the urologist's judgment is often, shall it be said, unduly influenced by the desire of the patient to avoid a major surgical procedure. I doubt that this state of affairs ever occurs more frequently than in the treatment of stones in the ureter. The patient visualizes the rapid and successful removal of his stone by manipulation, while the urologist remembers the numerous failures associated with such procedures; through his mind flash the serious and not infrequent fatal complications that can so rapidly occur, many examples of which were reported by Drs. Rusche and Bacon earlier in this meeting. It is imperative, therefore, to acquaint the patient with the possibilities of serious complications occurring as a result of manipulative procedures and obtain his consent for immediate major surgical intervention, should they occur. Such complications result from three causes. First and most important is urinary obstruction, second ureteral trauma with its associated periureteritis, and third and least frequent perforation. The possibility of any one of these three complications occurring is minimized, as Dr. Alyea had emphasized, by avoiding the use of steel instruments and employing only catheters for manipulative procedures. These insure the continued passage of urine by an obstruction, should any occur. They produce the least amount of trauma, and it is difficult if not impossible to produce ureteral perforation with them. They have still the added advantage of being able to be removed singly, if the manipulator is unsuccessful, while in the case of the mechanical instruments, if a stone gets caught crosswise, neither the instrument nor the stone can be recovered without resorting to some major surgical procedure.

DR. F. E. B. FOLEY, St. Paul: My ideas about the management of ureteral stone and particularly expectancy and manipulation versus open operation have been influenced by a particular technic for lumbar ureterotomy that I devised and first reported before this section at the 1934 meeting. Supported by further experience I wish to point out again the important bearing it may have on the decision between manipulation and open operation. The decision between expectancy and manipulation or open operation in the case of a stone in the lumbar ureter is an entirely different problem from the same decision in the case of a stone in the pelvic ureter. Pelvic ureterotomy is always a more or less formidable procedure beset by the usual hazards of major surgery. Accordingly, when the stone is in the pelvic ureter major operation of this sort usually should be avoided in favor of expectancy and manipulation. This is not the case when the stone is in the lumbar ureter. The usual form of lumbar ureterotomy is also a distinctly major operation but it can and should be an almost minor one. When the choice is between this improved form of lumbar ureterotomy or expectancy and manipulation there is, in most cases, very little to recommend the latter. The choice between expectancy and manipulation or open operation should be dictated by only one thing—welfare of the patient. To attain this one must consider mortality, morbidity (irreparable pathologic change), period of disability and discomfort to be endured. In respect of all these, when the stone is first discovered in the lumbar ureter advantage lies entirely with

this new and improved form of lumbar ureterotomy and not with expectancy and manipulation. When a stone of anything of truly minute size is first discovered in the lumbar ureter the patient's welfare will be served best by its immediate removal by this method of open operation. In such cases it is no trouble to start expectancy and manipulation, but how much trouble will ensue before success or failure results is another question. The patient will be obliged to endure at least a few attacks of colic. One or two or even three or four cystoscopic manipulations may be necessary and are a real hardship. In the report of Drs. Thompson and Kibler it is notable that most of the stones shown in the lumbar segment of the ureter were removed by open operation. This is a sensible retreat from the radical conservatism of expectancy and manipulation that prevailed until recently.

DR. VINCENT J. O'CONOR, Chicago: I wish to add, apropos of Dr. Foley's discussion, an unfortunate experience which he has not mentioned but which has occurred in our experience on fourteen occasions in some sixty operations, recently reviewed, for lumbar ureterotomy through a high anterior incision. First of all, I would like to agree that under favorable circumstances this is the most satisfactory of all urologic operative procedures. It is without shock, recovery is rapid and no damage is done in the removal of the stone. But the success of the procedure depends on the fact that the stone remains in that portion of the upper ureter which it occupied before the incision was made. Some 20 per cent of these upper ureteral calculi will ascend to the upper ureter or renal pelvis after the patient has been anesthetized, especially under spinal anesthesia, and the use of any degree of the Trendelenburg position. This same change of position has occurred no matter what position the patient has assumed on the operating table. In discussing this method, which he describes as so simple, one should bear this fact in mind.

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# THE REACTION OF PERIPHERAL BLOOD AND BONE MARROW

## IN CHRONIC HEMORRHAGE AND IN ESSENTIAL THROMBOPENIC PURPURA

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AND
EMIL M. SCHLEICHER, M.S.
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The circulating cellular elements in the peripheral blood are dependent largely on a normal maturation process in the bone marrow. If this is disturbed, disease results. Thus granulocytopenia is associated with a maturation arrest of the myeloid tissue and pernicious anemia with a disturbance in the maturation process of the erythroid tissue.

It has been noted in essential thrombopenic purpura that there is a hyperplasia of the megakaryocytic tissue which is associated with a reduction in the number of platelets in the peripheral blood and with abnormalities in platelet size. This has led to two interpretations of the mechanism of the disease. By some the primary defect is attributed to a failure in the maturation of the megakaryocyte.[1] The cell does not reach sufficient maturity to form platelets. By others the hyperplasia is attributed to a compensatory response to excessive destruction of platelets in the peripheral blood.[2] In essential thrombopenic purpura there is also a varying degree of blood loss which is dependent on the severity of the disease. The megakaryocytic hyperplasia has also been attributed to this factor.[3] It seemed therefore important to study the bone marrow and peripheral blood in cases of chronic bleeding as well as in cases of essential thrombopenic purpura with the hope that evidence could be obtained which would explain the mechanism of the bone marrow response in essential thrombopenic purpura.

### MATERIAL AND METHODS

This study comprised: Five normal men and five normal women. Six patients with thrombopenic purpura, in five of whom the spleen was removed, and two chronic cases, one essential and the other supposedly secondary in type. Three patients with symptomatic purpura primarily due to a toxic capillary disease. Five patients with chronic hemorrhage, the condition of two being due to duodenal ulcers, of one to hemorrhoids and of two to profuse and abnormally long menstrual periods; these are studied before and after the cause of bleeding was corrected and after iron therapy was instituted. Three blood donors who had given from 500 to 800 cc. of blood; these subjects of acute hemorrhage were studied at one hour, four hours and from forty-eight to seventy-two hours following the removal of blood.

We have described in detail elsewhere a method of obtaining, preparing and studying bone marrow cells and its evaluation, from a clinical point of view.[4]

Complete hematologic studies and tests were made on all patients at frequent intervals. These included hemoglobin determination, red and white counts, platelet studies (the direct method and the indirect blood smear method), reticulocyte counts, differentials, sedimentation rate, and the Wintrobe indexes[5] as well as the bleeding, coagulation and clot retraction time. The capillary resistance or tourniquet test was done by means of a cuff and blood pressure apparatus.

The bone marrow in the active cases of essential thrombopenic purpura was studied before and after blood transfusions were given at frequent intervals following splenectomy. In the chronic cases of thrombopenic purpura and symptomatic purpura, sternal marrow aspirations were performed during the active phase and after the purpuric reaction disappeared. The splenectomies were performed by Dr. Warren H. Cole.

### MATURATION OF MEGAKARYOCYTES

Wright's[6] original finding that the megakaryocytes are the only source of true platelets has been repeatedly confirmed both clinically and experimentally by many investigators.[7] The origin, formation and morphologic description of the megakaryocytes in human adult bone marrow under normal and pathologic conditions has been reserved for subsequent report. For clarity we will categorically outline the stages in the development of the megakaryocyte. The earliest type of megakaryocyte (promegakaryocytes) has a number of morphologic characteristics similar to those of the myeloblast. Through a series of changes first in the nucleus and later in the cytoplasm the multilobulated adult mega-

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karyocyte is formed. These cells are formed occasionally by a series of complicated mitotic divisions of the nucleus without cell division. Rarely, fusion of reticular or so-called histoid cells may form a polykaryocyte. In the megakaryocyte the best criteria of maturity are the amount, character and arrangement of azurophilic granules in the cytoplasm. The number of lobes or nuclear configuration is of little value in this respect. In our differential counts we have designated three types of cells, "young, adult and degenerated." Under young forms are included the promegakaryocytes seen chiefly in essential thrombopenic purpura and the intermediate forms seen usually in chronic hemorrhage.

The formation of platelets occurs by a process of budding or by detachment of portions of the cytoplasm of the megakaryocytes in the bone marrow. It may also occur by cytolysis of the cytoplasm of these cells. The latter process is seen more frequently in aspirated human bone marrow.

## RESULTS AND ANALYSIS

*Normal Individuals.*—The five men and five women, who in some cases had more than one sternal marrow examination, showed a myeloid-erythroid volume which averaged 5.5 per cent. The megakaryocytes, which are scattered throughout the field, averaged 52.2 to the 18 mm. square area or 58.8 when corrected for 1,000,000 nucleated bone marrow cells. The differential megakaryocyte count revealed 48 per cent adult type with 24 per cent young and 28 per cent degenerated forms. The peripheral blood showed an average normal cell size of 88 cubic microns with a mean corpuscular hemoglobin concentration of 33 per cent. The blood platelets ranged from 200,000 to 350,000. These were mostly uniformly small.

*Essential Thrombopenic Purpura (Active Phase).*—Four of the five patients were first seen and examined during the active phase of the disease. They presented spontaneous bleeding into the skin or following the

TABLE 1.—*Conditions Found in the Peripheral Blood and Bone Marrow in Cases of Essential Thrombopenic Purpura Before and After Splenectomy*

| | | | | | | Peripheral Blood | | | Bone Marrow | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Megakaryocytes, Differential Count, per Cent | | |
| Case | Initials | Sex | Age, Yrs. | Date | Cases of Essential Thrombopenic Purpura | Mean Corpuscular Volume, Cubic Microns | Mean Corpuscular Hemoglobin Concentration % | Platelets (Thousands) | Megakaryocytes per 18 Mm. Square | Megakaryocytes per Million Nucleated Bone Marrow Cells | Myeloid-erythroid, Volume % | Young | Adult | Degenerated |
| 1 | E. M. | ♂ | 17 | 9/16/37 | Before splenectomy | 81 | 31 | 12.0 | 661.0 | 556.8 | 6.5 | 55.0 | 21.0 | 24.0 |
| | | | | 3/16/38 | After splenectomy | 81 | 33 | 205.0 | 38.0 | 30.9 | 5.0 | 20.0 | 50.0 | 30.0 |
| 2 | D. T. | ♀ | 14 | 3/25/38 | Before splenectomy | 87 | 28 | 48.0 | 240.0 | 380.9 | 12.0 | 39.0 | 48.0 | 13.0 |
| | | | | 8/ 2/38 | After splenectomy | 85 | 31 | 326.0 | 210.0 | 105.5 | 8.5 | 35.0 | 48.0 | 17.0 |
| 3 | R. V. | ♀ | 23 | 6/24/38 | Before splenectomy | 94 | 28 | 18.0 | 1,866.0 | 1,376.1 | 41.0 | 50.0 | 26.0 | 24.0 |
| | | | | 7/22/38 | After splenectomy | 91 | 27 | 402.0 | 630.0 | 702.6 | 16.0 | 37.0 | 45.0 | 17.0 |
| 4 | F. R. | ♀ | 21 | 12/5/38 | Before splenectomy | 81 | 31 | 160.0 | 1,951.0 | 1,088.0 | 24.0 | 28.0 | 49.0 | 23.0 |
| | | | | 1/3/39 | After splenectomy | 82 | 35 | 380.0 | 335.0 | 335.0 | 10.0 | 7.0 | 65.0 | 28.0 |
| 5 | R. F. | ♂ | 16 | 11/9/37 | Spleen not removed | 83 | 36 | 0-39.0 | 168.0 | 136.7 | 6.5 | 50.0 | 25.0 | 25.0 |
| Normal individuals (10) | | | | | | 88 | 33 | 200.0 350.0 | 52.2 | 58.8 | 5.5 | 24.0 | 48.0 | 28.0 |

TABLE 2.—*Conditions Found in the Peripheral Blood and Bone Marrow in Cases of Chronic Hemorrhagic Anemia*

| | Peripheral Blood | | | Bone Marrow | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Megakaryocytes, Differential Count, per Cent | | |
| Case | Mean Corpuscular Volume, Cubic Microns | Mean Corpuscular Hemoglobin Concentration, per Cent | Blood Platelets, Thousands | Myeloid-erythroid Volume, per Cent | Megakaryocytes per 18 Mm. Square | Megakaryocytes per Million Nucleated Bone Marrow Cells | Young | Adult | Degenerated |
| 1 | 61.0 | 22.0 | Increased | 21.0 | 1,635.0 | 1,277.0 | 55.0 | 23.0 | 22.0 |
| 2 | 50.0 | 26.0 | Normal | 10.0 | 159.0 | 113.0 | 25.0 | 54.0 | 21.0 |
| 3 | 77.0 | 25.0 | Normal | 9.0 | 120.0 | 81.0 | 36.0 | 45.0 | 19.0 |
| 4 | 75.0 | 27.0 | Normal | 10.0 | 459.0 | 306.0 | 11.0 | 66.0 | 23.0 |
| 5 | 59.0 | 28.0 | Increased | 9.0 | 420.0 | 336.0 | 24.0 | 54.0 | 22.0 |
| Normals (10 cases) | 88.0 | 33.0 | 200-350 | 5.5 | 52.2 | 58.8 | 24.0 | 48.0 | 28.0 |

TABLE 4.—*Summary of the Conditions Found in Peripheral Blood and Bone Marrow in All the Cases Studied*

| | | Peripheral Blood | | | Bone Marrow | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Megakaryocytes, Differential Count, per Cent | | |
| Diseases | No. of Cases Studied | Mean Corpuscular Volume, Cubic Microns | Mean Corpuscular Hemoglobin Concentration, per Cent | Platelets, Thousands | Megakaryocytes per 18 Mm. Square | Megakaryocytes per Million Nucleated Bone Marrow Cells | Myeloid-erythroid, Volume per Cent | Young | Adult | Degenerated |
| Normal individuals | 10 | 88.0 | 33.0 | 200.0-350.0 | 52.2 | 58.8 | 5.5 | 24.0 | 48.0 | 28.0 |
| Essential thrombopenic purpura | 5 | 85.0 | 31.0 | 0-160.0 | 977.0 | 707.0 | 18.0 | 44.4 | 33.8 | 21.8 |
| Chronic essential thrombopenic purpura | 1 | 94.0 | 32.0 | 110.0 | 1,713.0 | 1,487.0 | 7.0 | 52.0 | 24.0 | 24.0 |
| Chronic thrombopenic purpura, secondary | 1 | 94.0 | 34.0 | 12.0- 67.0 | 12.0 | 10.0 | 30.0 | 34.0 | 33.0 | 33.0 |
| Thrombopenic purpura with hemorrhagic episodes | 1 | 97.0 | 37.0 | 224.0 | 24.0 | 426.2 | 8.0 | 24.0 | 41.0 | 35.0 |
| Symptomatic purpura | 3 | 82.0 | 31.0 | Normal | 177.5 | 156.6 | 11.0 | 31.5 | 42.0 | 26.5 |
| Chronic hemorrhagic anemia | 5 | 64.0 | 26.0 | Normal, increased | 559.0 | 423.0 | 11.8 | 31.0 | 48.0 | 21.0 |
| Acute loss of blood | 3 | 82.0 | 35.0 | Normal, increased | 215.0 | 140.0 | 12.0 | 11.0 | 75.0 | 14.0 |

application of a tourniquet to the arm in order to obtain blood from a vein. Petechiae were scattered over the arms, abdomen and legs. Bleeding occurred from the nose and gums and in some cases from the bowel, kidney and vagina. In the females there were disturbances in the menstrual cycle. The bleeding time was

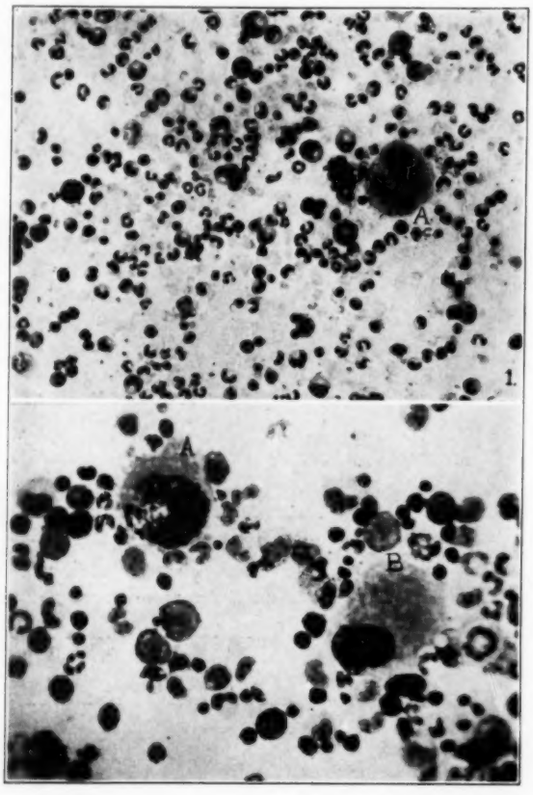


Fig. 1.—1. Normal bone marrow: *A*, adult megakaryocyte. 2. Essential thrombopenic purpura (case 3): *A*, multipolar mitosis of a megakaryocyte; *B*, adult megakaryocyte.

prolonged; the coagulation was normal with a poor or absent clot retraction. The blood platelets were absent or markedly reduced in number. The tourniquet test was strongly positive during this active stage in all the cases. The peripheral blood showed a normocytic anemia. The red cell size ranged from 81 to 96 cubic microns and the mean corpuscular hemoglobin concentration varied between 28 and 36 per cent. The blood platelets, besides being low, showed marked variations in size. This abnormality was a constant finding. The bone marrow was characterized by a myeloid-erythroid-megakaryocytic hyperplasia ranging from 6.5 to 41.0 per cent, compared with an average of 5.5 per cent seen in the normal controls. The number of megakaryocytes was greatly increased in all the cases. They ranged from 136 to 1,376 per million nucleated bone marrow cells, compared with a normal average of 58.0. Young forms, mostly promegakaryocytes, varied from 39 to 55 per cent of the differential count. This is high when compared with the average of 24 per cent, mostly intermediate forms, present in the normal individuals.

The megakaryocytic hyperplasia has persisted through temporary remissions induced by blood transfusions even though the peripheral blood showed a moderate increase in the number of platelets.

Following splenectomy there is a cessation of bleeding with a gradual increase in the number of blood platelets. The platelets are changed to a more normal appearance.

The bone marrow hyperplasia gradually, but not uniformly, returns to normal both quantitatively and qualitatively. The hyperplasia of the megakaryocytic tissue persists long after the myeloid and erythroid increase has returned to normal. The changes that take place in the degenerated types of megakaryocytes are of interest.

Prior to splenectomy, many of the cells classified as degenerated forms show a normal nucleus, a hyaline cytoplasm and an absence of azurophilic granules. They produce cytoplasmic buds or so-called pseudoplatelets. This type of megakaryocyte disappeared following splenectomy.

In case 3 the thrombopenic purpura was complicated by hyperthyroidism. Following splenectomy the symptoms and signs due to the former process disappeared but the thyroid disease persisted. This was relieved by thyroidectomy at a later date. The bone marrow showed a hyperplasia and an abnormality of the megakaryocytic tissue. Mitosis of the megakaryocytes, which was never seen in normal bone marrow and only rarely in the bone marrow of patients with hyperthyroidism, was a frequent finding. Jones [8] has shown that in hyperthyroidism there is a myeloid-erythroid hyperplasia with an increase in the number of megakaryocytes. This gradually returns to normal following thyroidectomy. Most of the megakaryocytes are adult types and

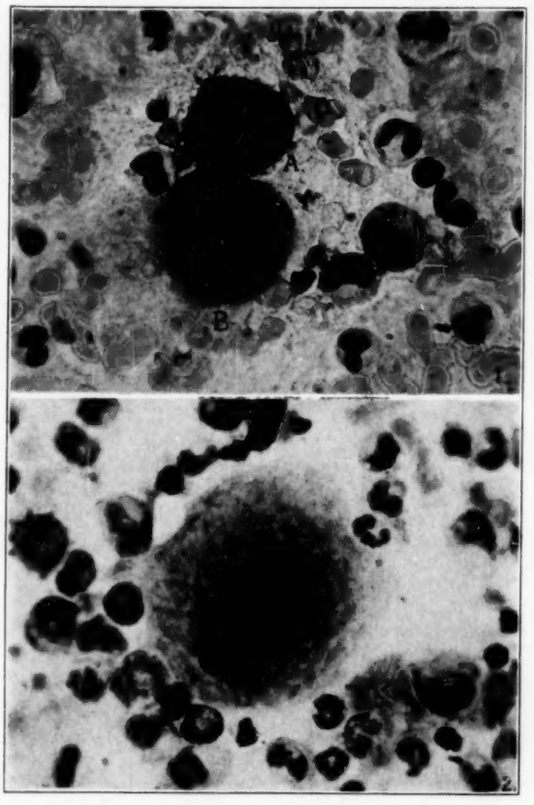


Fig. 2.—1. Young megakaryocytes: *A*, promegakaryocytes; *B*, intermediate type. 2. Adult megakaryocyte.

mitosis of these elements is rarely observed. This is further evidence that essential thrombopenic purpura is primarily a disease of the megakaryocytes.

*Chronic Thrombopenic Purpura.*—The megakaryocytic hyperplasia exceeds that seen in the acute cases (table 4). Fifty-two per cent of the megakaryocytes

8. Jones, R. M.: Human Sternal Marrow in Hyperthyroid and Myxedematous States, Proc. Soc. Exper. Biol. & Med., to be published.

in the differential smear were young forms (promegakaryocytes). The myeloid-erythroid volume was only slightly increased. A woman aged 45 gave a history of spontaneous bleeding into the skin or ready bruising for the past four years. The platelet counts taken during several of these periods never dropped lower than 90,000. The tourniquet test was positive. The bleeding time only slightly increased, with a normal coagulation time and a poor clot retraction. Except for the platelet reduction, the peripheral blood studies were quite normal.

*Thrombopenic Purpura with Hemorrhagic Episodes.*—A woman aged 28 had thrombopenic purpura for the past sixteen years in a chronic form with relapses and remissions during which insignificant spontaneous bleeding occurred. Bleeding into the skin in the form of petechiae and from the kidney was present during the active phase of the disease. The blood platelets dropped as low as 50,000 during a relapse. No bone marrow studies were done prior to splenectomy. Following the removal of the spleen the platelets reached a level of 224,000. The bleeding episodes were reduced but not abolished. The bone marrow showed a myeloid-erythroid-megakaryocytic hyperplasia with most of the young forms of a promegakaryocytic type (table 4). Complete recovery from the disease is not to be expected in this case, since the bone marrow has not as yet returned to normal following splenectomy.

*Symptomatic Purpura.*—In the three cases the purpura was primarily due to capillary disease. The blood platelets were normal in number and in character. The megakaryocytes in the bone marrow were increased in number but they never reached the level seen in acute or chronic essential thrombopenic purpura (table 4). The differential megakaryocytic count was normal. The bleeding, coagulation time and retraction of the clot were normal. The tourniquet test was positive. The toxic factor in these two cases accounted for the increased myeloid-erythroid volume, which was reflected in the peripheral blood by a polymorphonuclear leukocytosis and toxic changes in the granulocytes. The anemia was normocytic in type.

*Chronic Hemorrhage.*—The bone marrow hyperplasia is reflected in the peripheral blood by a microcytic hypochromic red blood cell. The blood platelets are normal or increased in number and mostly small type. In some cases, especially if a complication is present, most of the megakaryocytes are intermediate forms between the young (promegakaryocyte) and the adult type. The platelets are numerous in the aspirated bone marrow material and they exceed in number the blood platelets taken from the buffy layer (leukocytes and platelets) in the hematocrit tube used for the determination of the packed red blood cells in the peripheral blood. Thus in chronic hemorrhage an intermediate type of megakaryocyte is capable of producing platelets which are morphologically and physiologically normal. This emphasizes again the finding that cytoplasm of these platelet forming cells is a better criterion of maturity than is the nucleus. Although the cell is not as large and its nucleus not so complicated as the adult type of megakaryocyte, apparently the cytoplasm contains its full quota of azurophilic granules. These cells are illustrated in figure 2.

*Acute Loss of Blood.*—Three normal healthy young persons, two men and one woman, were studied one hour, twenty-four hours and two days after the donation of 500 cc. of blood. The peripheral blood showed a slight leukocytosis and a small increase in the number of normal platelets. The bone marrow revealed a myeloid-erythroid-megakaryocytic hyperplasia. This occurred between twenty-four and forty-eight hours after the removal of the blood. In table 4 one such case is illustrated. The adult megakaryocytes are definitely increased in number.

## COMMENT

The cause of essential thrombopenic purpura is not entirely clear. Much clinical and experimental work has been done and many theories have been advanced. Rosenthal [9] and others [10] have written comprehensively on the subject. Therefore only a few of the important and recent investigators will be touched on in this paper. Werlhof's [11] name has been attached to this disease since his report of a case in 1775. Hayem [12] called attention to the lack of changes in the erythrocytes, the reduction in number and the abnormalities in the platelets, the occasional leukocytosis without any apparent inflammatory condition, the normal coagulation and the lack of clot retraction. He believed that the platelet reduction was either the result of destruction or a defect in their production. Frank [13] was of the opinion that the

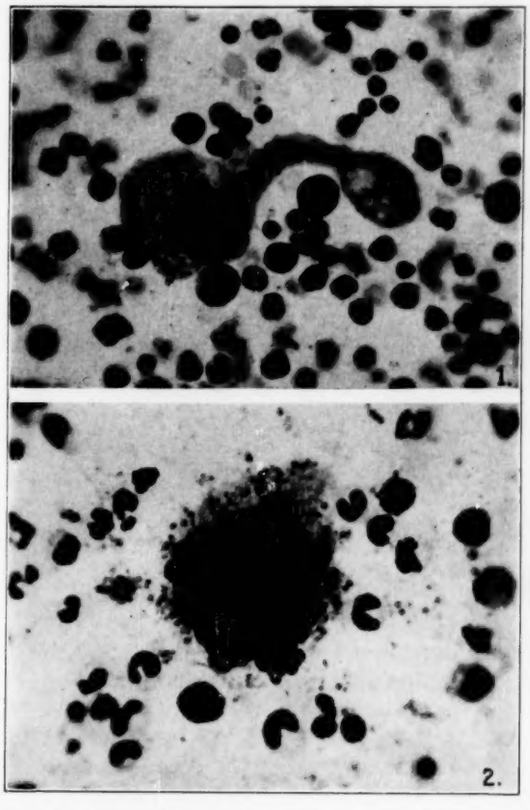


Fig. 3.—1. Adult megakaryocyte with large pseudopodia. 2. Megakaryocyte showing platelet formation.

9. Rosenthal, Nathan: Blood Platelets and Megacaryocytes: Hemorrhagic Diathesis, in Downey's Handbook of Haematology, vol. 1, New York, Paul B. Hoeber, Inc., 1938.

10. Wintrobe, M. M.; Hanrahan, E. M., Jr., and Thomas, C. B.: Purpura Haemorrhagica with Special Reference to Course and Treatment, J. A. M. A. **109:** 1170 (Oct. 9) 1937. Giffin, H. Z.: Essential Thrombocytopenic Purpura, Internat. Clin. **46:** 95 (Dec.) 1936. Jones, O. P.: Cytology of Pathologic Marrow Cells with Special Reference to Bone Marrow Biopsies, in Downey's Handbook of Haematology, vol. 3, New York, Paul B. Hoeber, Inc., 1938.

11. Werlhof, P. G.: Opera Medica, Hannoverac imp. fratrum Helwingiorum **2:** 615, 1775-1776.

12. Hayem, G.: Leçons sur les maladies du sang, Paris, Masson & Cie, 1900.

13. Frank, E.: Aleukia Splenica (splenogene Leuko-Myelotoxikose), Berl. klin. Wchnschr. **53:** 555 (May) 1916.

reduction in the number of circulating blood platelets and the morphologic changes of the megakaryocytes in the bone marrow were due to some noxa probably having its origin in the spleen. Minot [14] believes that the causative agent acts on the blood platelets, on the megakaryocytes or on the bone marrow as a whole. Kaznelson, who first removed the spleen in a case of

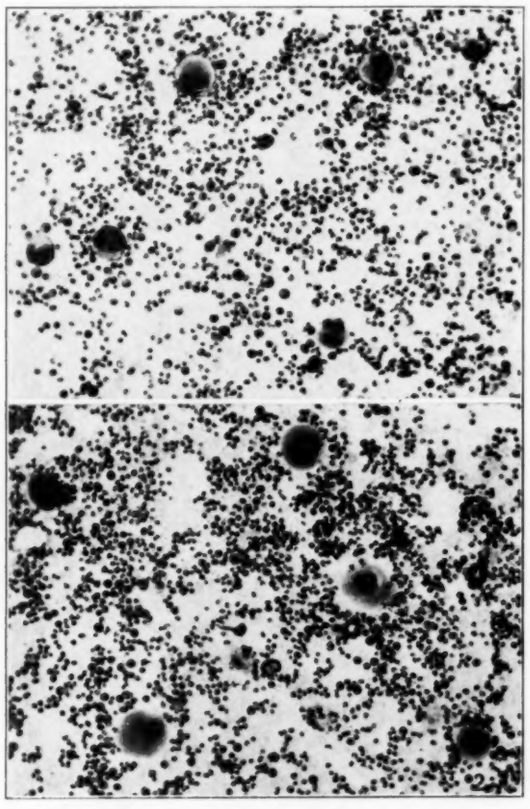

Fig. 4.—Essential thrombopenic purpura bone marrows: 1. Promegakaryocyte type. 2. Adult megakaryocytic type.

essential thrombopenic purpura, believed that the thrombocyte reduction in the peripheral blood was brought about by an increased thrombolytic activity of the spleen. The increase in the number of megakaryocytes in the bone marrow in his opinion was compensatory hyperplasia. Brill and Rosenthal [15] stated that the disease was associated with a disturbance in function of the capillary wall in addition to a disorder of the blood platelets. The changes in the capillary wall, they thought, were probably due to a reduction in the number of blood platelets. Other investigators [16] called attention to what they believed were morphologic changes in the granules in the cytoplasm and alterations in the nucleus of the megakaryocytes in the bone marrow. Naegeli [17] stated that a disease of the bone marrow was in the foreground.

The function of the spleen in its relation to essential thrombopenic purpura is not definitely understood. It is usually regarded as the graveyard of both red blood cells and thrombocytes. On the other hand the depression of the megakaryocytes in the bone marrow was believed by Frank [18] to be due to some inhibitory splenic influence directed against the reticulo-endothelial system from which the platelet forming cells and granulocytes have their origin. Recently Troland and Lee [19] have been able to decrease to a low level the blood platelets of normal rabbits by the intravenous injections of acetone extracts of a splenic tissue taken from patients operated on for essential thrombopenic purpura. Torrioli and Puddu,[20] in a series of experiments using splenic extracts from patients with Werlhof's disease, in a culture medium were able to show that the principle acting on the megakaryocytes at high doses injures them and at reduced doses stimulates them. They stated that this substance elaborated by the principal reticulo-endothelial centers seems to be likely to return to normality by means of splenectomy.

The bone marrow in this disease in the five cases we have studied contained an increased number of megakaryocytes. It will be noted in table 4 that the average number of these cells for all cases of thrombopenic purpura exceeds those seen in various other clinical conditions associated with an increased number of megakaryocytes in the bone marrow. This is also true for

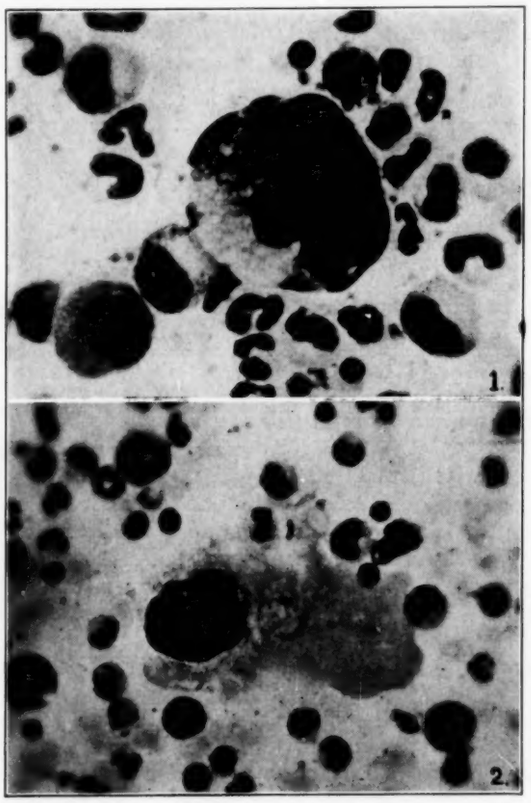

Fig. 5.—1 Degenerated megakaryocyte; normal bone marrow. 2. Degenerated megakaryocyte in which the cytoplasm is pulling away from the nucleus; normal marrow.

the number of young forms of these cells in the differential count of the megakaryocytes. In case 5 (table 1) the number of adult megakaryocytes was normal in the

14. Minot, G. R.: Diminished Blood Platelets and Marrow Insufficiency: A Classification and Differential Diagnosis of Purpura Haemorrhagica, Aplastic Anemia and Allied Conditions, Arch. Int. Med. **19:** 1062 (June) 1917.

15. Brill, N. E., and Rosenthal, Nathan: The Curative Treatment by Splenectomy of Chronic Thrombocytopenic Purpura, Am. J. M. Sc. **166:** 503 (Oct.) 1923.

16. Seeliger, S.: Ueber Organbefunde und ihre Bedeutung für die Pathogenese bei essentieller Thrombopenie und Aleukie, Klin. Wchnschr. **3:** 731 (April 22) 1924.

17. Naegeli, Otto: Blutkrankheiten und Blutdiagnostic, ed. 5, Berlin, Julius Springer, 1931.

18. Frank, E.: Die haemorrhagischen Diathesen, in Schittenhelm's Handbuch der Krankheiten des Blutes und der blutbildenden Organe, Berlin, Julius Springer, 1925.

19. Troland, C. E., and Lee, F. C.: Thrombocytopen: A Substance in the Extract from the Spleen of Patients with Idiopathic Thrombocytopenic Purpura That Reduces the Number of Blood Platelets, J. A. M. A. **111:** 221 (July 16) 1938.

20. Torrioli, Mario, and Puddu, Vittorio: Recent Studies on the Pathogenesis of Werlhof's Disease, J. A. M. A. **111:** 1455 (Oct. 15) 1938.

differential smear in the presence of a myeloid-erythroid hyperplasia. Thus when the process is acute the megakaryocytic hyperplasia is usually promegakaryocyte in character; when less acute it may be adult in type. In either instance the platelets in the bone marrow (concentration method) are as scarce as they are in the peripheral blood. This suggests a maturation arrest of

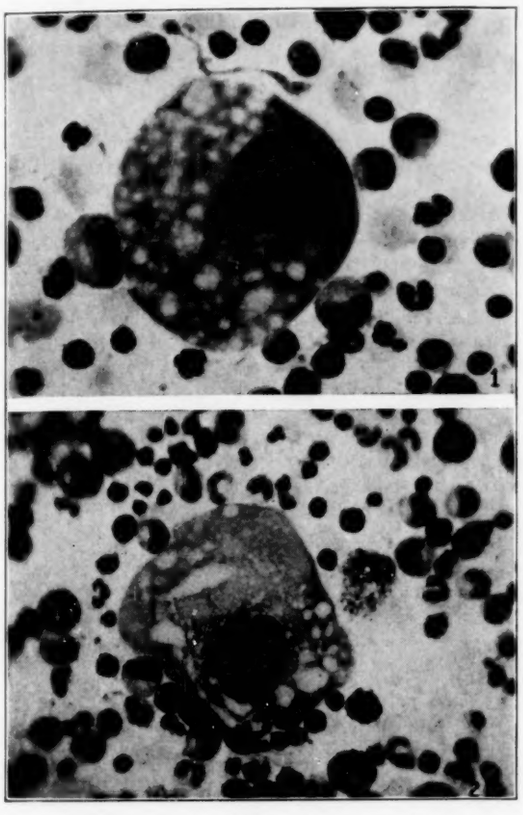

Fig. 6.—1. Cytolysis of the cytoplasm in a normal adult megakaryocyte. 2. A hyaline megakaryocyte with azure-free cytoplasm from a case of essential thrombopenic purpura.

the megakaryocytic tissue and thus speaks for a lack of platelet formation rather than an increased destruction of these elements. None of our spleens showed any signs of retained platelets. This finding in the spleen has been noted by other investigators.[21]

Nickerson and Sunderland,[22] using postmortem section material, stated that the differential cell counts showed no fundamental difference in the bone marrow in cases of idiopathic thrombopenic purpura haemorrhagica, various other forms of purpura haemorrhagica and normal controls. Other investigators [23] have called attention to a normal or increased number of megakaryocytes in the sternal marrow in this disease. Lawrence and Knutti [24] studied the bone marrow (biopsies) in patients with idiopathic thrombopenic purpura prior to removal of the spleen. They described two types of marrow in this disease. One type showed a normal and the other type abnormal morphologic changes as regards the megakaryocytes. They raised the question as to the probable value of bone marrow studies with regard to determining the prognosis of splenectomy in cases of chronic thrombopenic purpura, the first type probably giving good results following splenectomy and the operation being of little value in the second type of abnormal megakaryocyte marrow. Our work has shown that this prediction has not been borne out. Both types respond to splenectomy.

When the reaction following bleeding does increase the number of megakaryocytes in the bone marrow they are of the intermediate type and not the promegakaryocyte type seen in essential thrombocytopenic purpura. It should be further noted that in chronic essential thrombocytopenic purpura (table 4) in which hemorrhage has not occurred there is still a marked promegakaryocytic hyperplasia.

The failures following splenectomy in some cases diagnosed essential thrombopenic purpura have not been satisfactorily explained. Accessory spleens have been advanced as the cause of failure in some cases.[25] That the spleen is only part of the reticulo-endothelial system and that other parts of this system might be primarily effective in destroying platelets has also been suggested (Kaznelson). It may be due to other undetermined causes. In this category the case of thrombopenic purpura with hemorrhagic episodes (table 4) might be classified. The patient was greatly improved clinically, the platelets increased in number and the bleeding episodes have markedly diminished. The bone marrow, however, has not returned to normal one year after splenectomy, and so the fundamental defect has not been entirely corrected.

## CONCLUSIONS

1. Acute hemorrhage causes a uniform stimulation of the bone marrow with a myeloid, erythroid and megakaryocytic hyperplasia. The megakaryocytes are of the adult type. The hyperplastic marrow promptly returns to normal.

2. Chronic hemorrhage causes a similar hyperplasia. The megakaryocytes are usually of the adult type, but there may be many intermediate ones if the hemorrhage is repeated and exhausting. With abolition of the hemorrhages, the bone marrow returns to normal. Platelets are present in large numbers in the bone marrow and in the periphreal blood.

3. In essential thrombopenic purpura with hemorrhage there is a similar uniform hyperplasia of the bone marrow. In the more chronic cases without significant hemorrhage the myeloid and erythroid hyperplasia may be absent, but the megakaryocytic hyperplasia persists.

4. In essential thrombopenic purpura the megakaryocytes are of the young form. In the acute phase the promegakaryocytes predominate, in the less acute phases the adult type appears. Hyaline megakaryocytes which produce the large pseudoplatelets have been found only in essential thrombopenic purpura. Platelets are reduced equally in the bone marrow and in the peripheral blood.

5. Splenectomy causes the bone marrow to revert to normal. Unless this reversion is established, the bleeding episodes continue.

21. Brill, N. E., and Rosenthal, Nathan: Treatment by Splenectomy of Essential Thrombocytopenia (Purpura Haemorrhagica), Arch. Int. Med. **32:** 939 (Dec.) 1923. Leschke, E., and Wittkower, E.: Die Werlhofsche Blutfleckenkrankheit, Ztschr. f. klin. Med. **102:** 6, 1926.

22. Nickerson, D. A., and Sunderland, D. A.: The Histopathology of Idiopathic Thrombocytopenic Purpura, Am. J. Path. **13:** 463 (May) 1937.

23. Doan, C. A.; Moore, C. V., and Ross, T. F.: The Differential Diagnosis and Therapeutic Rationale of the Anemia States, Ohio State M. J. **33:** 975 (Sept.) 1937. Rohr, K.: Die diagnostische Bedeutung der Sternalpunktion, Helvet med. acta **1:** 713, 1935. Bethell, F. H.; Isaacs, Raphael; Goldhamer, S. M., and Sturgis, C. C.: Blood—A Review of the Recent Literature, Arch. Int. Med. **61:** 923 (June) 1938. Limarzi, L. R., and Schleicher, E. M.: Bone Marrow in the Active Phase of Essential Thrombocytopenic Purpura, J. A. M. A. **112:** 879 (March 4) 1939.

24. Lawrence, J. S., and Knutti, R. E.: The Bone Marrow in Idiopathic Thrombopenic Purpura, Am. J. M. Sc. **188:** 37 (July) 1934.

25. Morrison, M.; Lederer, M., and Fradkin, W. Z.: Accessory Spleens —Their Significance in Essential Thrombocytopenic Purpura Haemorrhagica, Am. J. M. Sc. **176:** 672 (Nov.) 1928.

6. The view that essential thrombopenic purpura is a disease due to faulty maturation of the megakaryocytes is favored. Splenectomy removes a factor which is inhibitory to maturation.

7. The differential diagnosis of the symptomatic purpuras from other hemorrhagic states is not difficult.

8. The diagnosis of purpuric states can be made most satisfactorily from bone marrow studies. Such studies should lead to a more satisfactory classification of the purpuras.

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## ABSTRACT OF DISCUSSION

DR. CARL V. MOORE, St. Louis: There is little reason to doubt that the spleen functions abnormally in essential thrombopenic purpura. The vast majority of patients recover following splenectomy and the bone marrow nearly always contains an increased number of megakaryocytes, many of which are young forms. The spleen could theoretically produce the disease in one of two ways: (1) by destroying platelets at a greatly accelerated rate or (2) by inhibiting their formation. The authors interpret their observations as indicating a maturation arrest of the megakaryocytes in bone marrow. Their conclusions therefore favor the second of the two possible mechanisms stated. Similar implications were provided by the recent work of Troland and Lee, which described the preparation of an acetone extract of spleens removed from patients with essential thrombopenic purpura. The material was found capable of profoundly depressing the platelet count in rabbits. I have not been able to recover the platelet lowering factor in any of three thrombopenic purpura spleens studied to date. Perhaps the more commonly accepted view is that which considers the disease to be produced by excessive splenic destruction of thrombocytes, and the increase in megakaryocytes to be a compensatory phenomenon. I have been led to believe that this mechanism is the one primarily operative because of the decided increase in phagocytic cells usually observed in fresh smears taken from the parenchyma of these spleens. Neither interpretation excludes the possibility of a combination of the two types of abnormal splenic influence. Fortunately, the uncertainties of these etiologic considerations are dwarfed by the practical fact that splenectomy practically always induces a remission.

DR. W. M. FOWLER, Iowa City: There is a diversity of opinion as to whether thrombopenic purpura is due to a failure of the bone marrow to produce or liberate platelets or whether it is due to an overdestruction of the platelets by the spleen. I agree with the authors that splenectomy is the treatment of choice in the severe cases. I have had no success with irradiation of the spleen, and the use of transfusions is usually of only temporary benefit. I wish to emphasize the importance of establishing a correct diagnosis so as to be sure that one is dealing with the idiopathic or essential form of thrombopenic purpura rather than the secondary or symptomatic form before advising removal of the spleen. I made a study of the cases of thrombopenic purpura that had been seen in the University Hospitals and from a total of 160 cases only seventeen could be considered idiopathic. The remaining 143 cases were definitely secondary to some other disease. Various types of blood dyscrasias accounted for eighty-one of these, the most common being the lymphomas and leukemias, pernicious anemia and aplastic anemia. Thrombopenic purpura was definitely associated with an infectious process in twenty-five cases and in several of these repeated recurrences of the purpuric manifestations coincided with acute exacerbations of the infection and disappeared with the subsidence of the infection. Various toxins and chemicals accounted for six cases, and twelve were associated with various types of liver disease. The remaining nineteen were associated with a wide variety of miscellaneous diseases. Splenectomy is of no value in this larger group of secondary thrombopenic purpura and it is essential that these cases be excluded before the operation is advised. The diagnosis of idiopathic thrombopenic purpura must rest not only on the characteristic laboratory and clinical manifestations but on the rigid exclusion of all diseases which may cause the secondary form. Even after establishing idiopathic or essential thrombopenic purpura as the diagnosis, a splenectomy is not advisable in all cases. Certain of these are so mild that the operation is not necessary and in some the bleeding has been controlled by transfusions and there were no recurrences. In the more severe forms, however, splenectomy is the treatment of choice, and the methods of bone marrow study which have been described this morning are essential in the selection of cases for splenectomy.

DR. EDWARD P. FLOOD, Bronx, New York: I should like to report a case of toxic thrombopenic purpura following the administration of sulfapyridine. March 16 a man aged 32, a bricklayer, was admitted to the hospital with a diagnosis of unresolved pneumonia. He had been ill for over a month. Pneumococcus type XVI was found in the sputum, and sulfapyridine therapy was instituted. He received an average of 6 Gm. a day for ten days. March 28 he developed a severe hemorrhagic purpura. The drug was discontinued and treatment started, consisting of daily transfusions, parenteral calcium, snake venom and ascorbic acid. The hemorrhages ceased after twelve days. April 15, tubercle bacilli were found in the sputum. This calls attention to an additional hazard in the injudicious use of sulfapyridine.

DR. LOUIS R. LIMARZI, Chicago: In general we agree that sternal aspiration should be a routine procedure in all conditions diagnosed purpura haemorrhagica. There has been no ill effect in more than 900 bone marrow studies, even when the procedure has been frequently repeated. Splenectomy has been the only treatment in my experience that gives lasting results in essential thrombopenic purpura. There is no contraindication to splenectomy in the acute phase of this disease if the patient has been adequately prepared and the operation is performed by a competent surgeon.

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# LUDWIG'S ANGINA, RETROPHARYNGEAL ABSCESS

## AND OTHER DEEP ABSCESSES OF THE HEAD AND NECK

MANUEL GRODINSKY, M.D.

OMAHA

Although many common suppurative processes about the head and neck such as localized suppuration of the lymph nodes give little concern and are rather easily cared for, the less common spreading lesions such as Ludwig's angina, retropharyngeal abscess and other deep collections of the head and neck usually are the cause of considerable anxiety and call for a thorough knowledge of the anatomy of the regions concerned as well as adequate surgical judgment and skill. The seriousness of these conditions lies in their tendency to spread along fascial planes and invade the thorax, with the production of mediastinitis.

Because of the numerous discrepancies in description of the fasciae and fascial spaces of the head, neck and adjacent regions, my associate, Dr. Holyoke, and I undertook a study of these fasciae and spaces at the anatomy department of the University of Nebraska College of Medicine. During the last four years ninety-five adult cadavers and five full term fetuses were studied by the methods of dissection, injection and section. The following report is a brief summary of our observations.[1] In addition, all cases of Ludwig's angina, retropharyngeal abscess and other deep abscesses of the head and neck occurring at the University Hospital have been reviewed. A more detailed

From the Departments of Surgery and Anatomy, University of Nebraska College of Medicine.

Read before the Section on Surgery, General and Abdominal, at the Ninetieth Annual Session of the American Medical Association, St. Louis, May 18, 1939.

1. Grodinsky, Manuel, and Holyoke, E. A.: The Fasciae and Fascial Spaces of the Head, Neck and Adjacent Regions, Am. J. Anat. **63**: 367-408 (Nov.) 1938.

report of these cases has been made elsewhere.[2] It is my purpose here merely to emphasize the clinical implications of our anatomic observations.

## FASCIAL LAYERS

The deep fascia of the neck may be divided into three main layers: superficial, middle and deep. The superficial layer crosses the midline of the neck anteriorly,

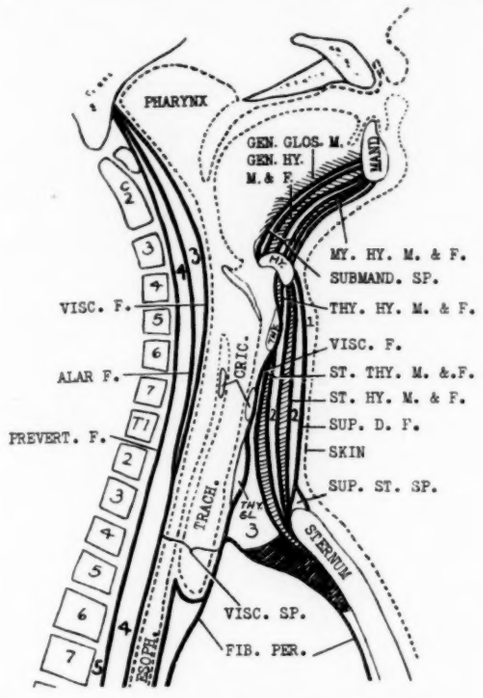


Fig. 1.—Fasciae of head and neck in midsagittal section.

covers the anterior triangle, splits to form the sheath of the sternocleidomastoid muscle, covers the posterior triangle, splits to form the sheath of the trapezius muscle and attaches to the spines of the vertebrae posteriorly. Just above the sternum it splits to form the suprasternal space of Burns and attaches to the anterior and posterior margins of the suprasternal notch (figs. 1, 2, 3, 4).

The middle layer consists of three subdivisions: the sternohyoid-omohyoid layer, the sternothyroid-thyrohyoid layer and the visceral layer. The first two of these surround the muscles indicated in their names and run into the deep surface of the sternocleidomastoid sheath laterally, fusing with the carotid sheath derived from the alar fascia (figs. 1, 2).

The visceral or pretracheal fascia, the deepest subdivision of the middle layer of deep cervical fascia, completely surrounds the thyroid gland, trachea and esophagus, thus forming the visceral space within which these structures lie. Each of these structures has in addition a capsule proper. Inferiorly the visceral fascia becomes continuous with the fibrous pericardium covering the heart and the great vessels of the thorax (figs. 1, 2, 3).

The deep layer of deep cervical fascia is composed of two subdivisions: the alar and the prevertebral layer, with the continuations of the latter (scalenus fascia, Sibson's fascia, transversalis fascia). The former, to our knowledge, has not been described before. It consists of a layer of fascia lying in a frontal plane between the visceral layer (behind the esophagus) and the prevertebral layer. It attaches to the latter at the tips of the transverse processes of the vertebrae and then continues anterolaterally to form the carotid sheath, which fuses with the deep surface of the sternocleidomastoid and sternothyroid-thyrohyoid sheaths. The prevertebral fascia passes in front of the bodies of the vertebrae, fuses to the tips of the transverse processes and to the alar fascia and then extends inferolaterally as the scalenus fascia, which forms the covering of the scalenus muscles and the axillary sheath. The scalenus fascia is continuous with the extrapleural fascia of the thorax and the transversalis fascia of the abdomen. As it passes over the dome of the pleura, it is identical with the layer known as Sibson's fascia (figs. 1, 2, 3, 4).

The potential spaces between these fascial planes may be conveniently subdivided into those of the infrahyoid region and those of the suprahyoid region. The infrahyoid fascial spaces may in turn be roughly subdivided into those of the anterior and those of the posterior triangle, the former being designated by numerals and the latter by corresponding numerals followed by the letter A.

## INFRAHYOID SPACES

Space 1 is the potential space between the skin and the superficial layer of deep fascia; that is, within the superficial fascia and containing the platysma muscles. Space 2 lies between the superficial layer of deep fascia and the deep surface of the sternothyroid-thyrohyoid layer. It is blind inferiorly at the origins of the ribbon muscles from the sternum. Space 2 A is the corresponding space in the posterior triangle, lying between the superficial layer of deep fascia and the sheath of the posterior belly of the omohyoid muscle. It is easily brought into communication with space 2 at the pulley

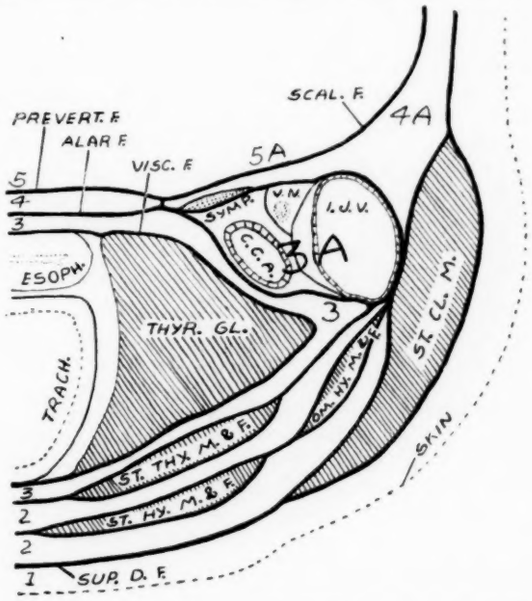


Fig. 2.—Fasciae of neck. Transverse section approximately at the level of the sixth cervical vertebra.

between the two heads of the omohyoid. Space 3 lies between the visceral fascia, on the one hand, and the sternothyroid-thyrohyoid layer, carotid sheath and alar fascia, on the other hand. On the anterior side, it extends inferiorly a short distance into the superior mediastinum, where it is shut off by adhesions between the fibrous pericardium and the sternum. On the pos-

2. Grodinsky, Manuel: Ludwig's Angina: An Anatomical and Clinical Study with Review of the Literature, Surgery **5:** 678-696 (May) 1939; Retropharyngeal and Lateral Pharyngeal Abscess: An Anatomical and Clinical Study with Review of the Literature, Ann. Surg. **110:** 177-199 (Aug.) 1939.

terior side, it extends from the base of the skull approximately to the sixth or seventh cervical vertebra, where the alar fascia becomes intimately fused with the visceral fascia, thus shutting off this space inferiorly (figs. 1, 2, 3).

A retropharyngeal abscess, extending through the posterior or lateral pharyngeal wall by lymphatics, veins or through traumatic wounds (foreign bodies), may

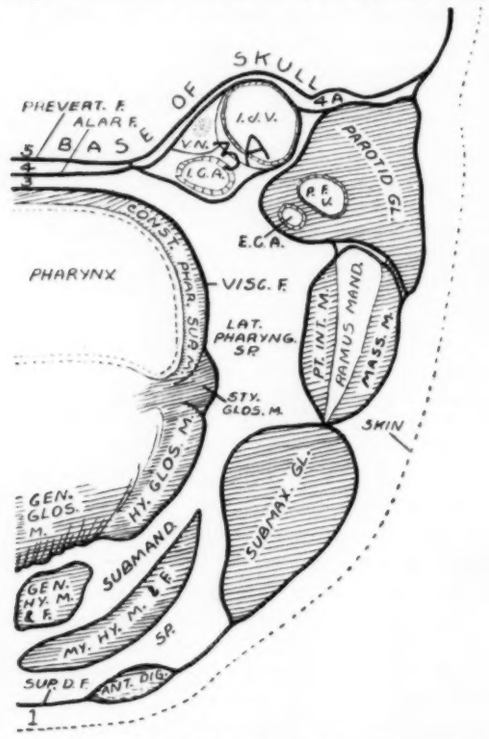


Fig. 3.—Fasciae of the head and neck. Oblique anteroposterior section showing the relation of the submandibular space to the lateral pharyngeal space and spaces 3 and 4.

involve the space between the posterior pharyngeal wall and the visceral fascia (visceral space), space 3 or space 4. In the former case it usually remains localized near its origin and can easily be evacuated by an incision through the mouth (Allen,[3] McKenzie[4]). When it involves space 3, it may also remain localized and be treated that way; but it may extend laterally and inferiorly to the superior mediastinum, in which case external drainage along the anterior border of the sternocleidomastoid muscles becomes necessary (Burckhardt,[5] Dean,[6] Kanavel,[7] Furstenberg[8]). When space 4 is involved primarily or secondarily, the infection is almost certain to spread inferiorly to the posterior mediastinum. Cervical or collar mediastinotomy (von Hacker,[9] Pearse[10]) anterior to the sternocleidomastoid muscle is then necessary if the condition is early or confined above the fourth thoracic vertebra. Where the infection has extended below the fourth thoracic vertebra or where collar mediastinotomy has failed to stop the process, dorsal mediastinotomy (Nasiloff[11]) offers the only hope of saving life (figs. 1, 2, 3, 6).

In true Ludwig's angina[12] the infection often spreads to the lateral pharyngeal space and then to space 3. From there it may extend inferiorly to the superior mediastinum or go through the alar fascia into space 4 with further extension to the posterior mediastinum as just described. On the other hand, extension from space 3 to the lateral pharyngeal space and from there to the submandibular space may lead to a picture closely resembling Ludwig's angina in the later stages, even though the origin and early routes of spread in the two cases are entirely different (figs. 1, 2, 3, 6, 7).

Space 3 A is the space within the carotid sheath containing the carotid artery, internal jugular vein and vagus nerve. This potential space is very limited and bears but little relation to infections of the head and neck except those associated with thrombosis within the internal jugular vein and with the lymph nodes lying within the sheath (figs. 2, 3).

Space 4, between the alar and the prevertebral fascia, extends from the base of the skull to the posterior mediastinum. Laterally it extends to the tips of the transverse processes to which both the alar and the prevertebral fascia attach. Because of its relationship to the posterior mediastinum it is called the "danger

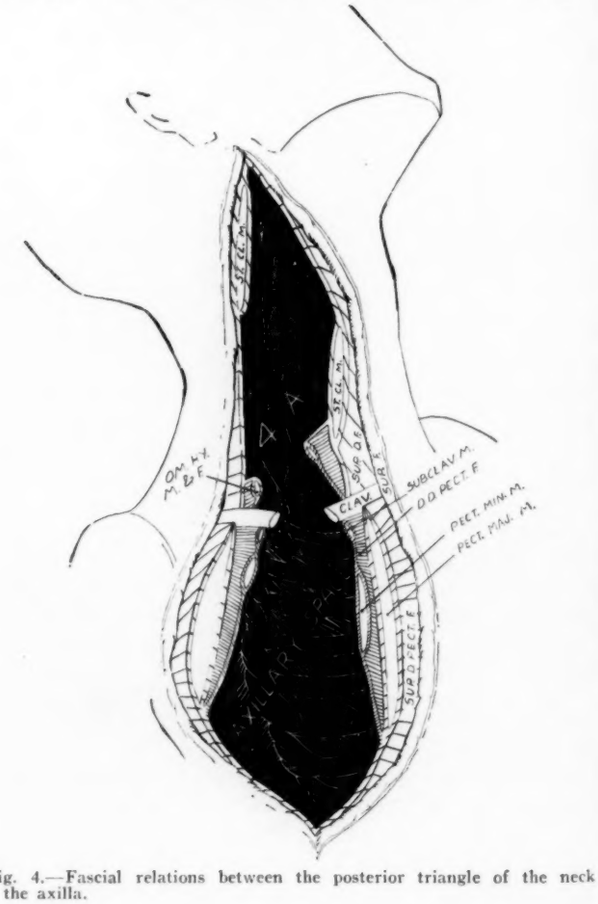


Fig. 4.—Fascial relations between the posterior triangle of the neck and the axilla.

space," and justly so, since infection within it, either primary or secondary, is almost certain to extend into the posterior mediastinum. As already shown, it may become involved, either primarily or secondarily, in retropharyngeal abscess and in Ludwig's angina. Such involvement must be recognized early by the symptoms

3. Allen, C. M.: Retropharyngeal Abscess, New York M. J. **7:** 307-342, 1851.
4. McKenzie, D.: Otogenic Pharyngeal Abscess, J. Laryng. **30:** 12-29, 1915.
5. Burckhardt, H.: Ueber die Eröffnung der retropharyngealen Abscess, Zentralbl. f. Chir. **15:** 57-59, 1888.
6. Dean, L. W.: The Proper Procedure for External Drainage of Retropharyngeal Abscess Secondary to Caries of the Vertebrae, Ann. Otol., Rhin. & Laryng. **28:** 566-572 (June) 1919.
7. Kanavel, A. B.: Retropharyngeal Abscess, S. Clin. North America **2:** 603-615 (June) 1922.
8. Furstenberg, A. C.: Acute Mediastinal Suppuration, Tr. Am. Laryng., Rhin. & Otol. Soc. **35:** 210-229, 1929.
9. von Hacker: Zur operativen Behandlung der perioesophagealen and mediastinalen Phlegmone nebst Bemerkungen der collaren und dorsalen Mediastinotomie, Arch. f. klin. Chir. **64:** 479-508, 1901.
10. Pearse, H. E., Jr.: Mediastinitis Following Cervical Suppuration, Ann. Surg. **108:** 588-611 (Oct.) 1938.
11. Nasiloff, J. J.: Oesophagotomia et resectio oesophagi endothoracica, Vrach **9:** 481, 1888.
12. Ludwig, D.: Med. Cor.-Bl. d. württemb. ärztl. Ver. **6:** 21-25, 1836.

(such as pain in the chest), physical abnormalities (such as dulness and diminished breath sounds) and x-ray appearances, and adequate treatment must be instituted, if life is to be saved (figs. 1, 2, 3, 6, 7).

Space 4 A, between the superficial layer of deep fascia and the scalenus fascia, is directly continuous with the axilla (fig. 4), but a dense fatty pad between the clavicle and the first rib makes this communication less free. Space 5 lies behind the prevertebral fascia and is of importance chiefly in directing the course of cold abscesses resulting from tuberculous caries of the vertebral bodies (figs. 1, 2, 3, 8). Space 5 A, deep to the scalenus fascia, lies between the deep muscles of the neck—the scaleni, the levator scapulae and the sacrospinalis (fig. 2).

### SUPRAHYOID SPACES

The suprahyoid spaces comprise the masticator, temporal, parotid, lateral pharyngeal and submandibular spaces. The masticator space (Coller and Yglesias,[13]

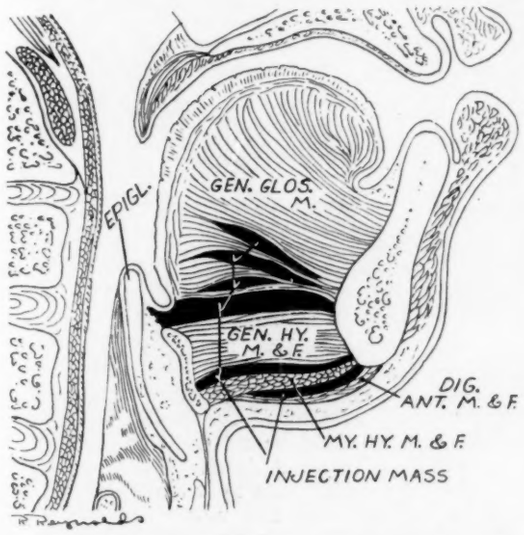


Fig. 5.—Median sagittal section showing collection of injection masses between submental muscles and particularly the extension of the mass between the genioglossus and geniohyoid muscles toward the epiglottis.

Juvara[14]), enclosed by the superficial layer of deep fascia, contains the masseter muscle, the pterygoid muscles and the ramus of the mandible and is continuous superiorly with the temporal space deep to the temporal fascia (superficial layer of deep fascia). Extension from these spaces may occur superficially in the face or deeply into the parotid, lateral pharyngeal or submandibular spaces. The parotid space we found to be a completely closed space formed by a split of the superficial layer of deep fascia (Juvara,[14] Coller and Yglesias,[13] Singer,[15] Merkel,[16] Charpy,[17] fig. 3).

The lateral pharyngeal space (Coller and Yglesias,[13] Mosher[18]), bounded by the pharynx, styloid muscles, carotid sheath, parotid gland, pterygoid muscles, mandible, masseter muscle and pterygomandibular raphe, communicates freely with the submandibular space deep to the submaxillary gland. Both spaces are shut off from the neck by the attachment of the sheaths of the stylohyoid muscle and posterior belly of the digastric muscle to the superficial layer of deep fascia superficially and to the carotid sheath deeply. Posteromedially, the lateral pharyngeal space communicates with space 3, from which it may become infected in

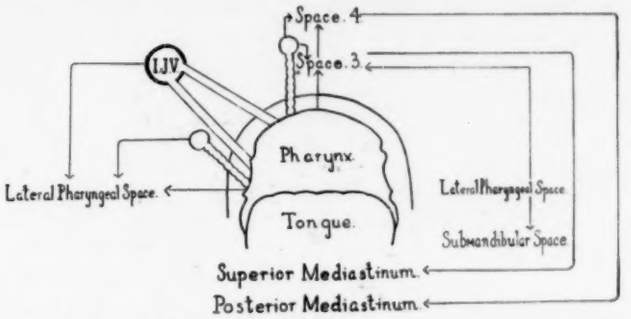


Fig. 6.—Routes of spread of infection by lymphatics, veins and fascial spaces in acute retropharyngeal abscess. The arrows indicate direct extension, the straight tubes veins, and the scalloped tubes lymph vessels.

retropharyngeal abscess. Infection in this space may travel in the reverse direction and involve space 3. This space may also be infected directly from the lateral wall of the throat (tonsils) and secondarily from the submandibular, parotid or masticator spaces. Likewise, infections in this space may spread to the submandibular space and in later stages resemble true Ludwig's angina. Abscess of the lateral pharyngeal space is best drained by a T incision (Mosher[18]) below the angle of the jaw in front of the sternocleidomastoid muscle, the submaxillary gland being displaced and the dissection carried bluntly along the carotid artery until the focus is reached (figs. 3, 6, 7).

"Submandibular space" is the term we are using to indicate the regions of the submental and submaxillary triangles lying between the mucous membrane of the floor of the mouth and the superficial layer of deep fascia over these regions. It contains the sublingual and submaxillary salivary glands and the genioglossus, geniohyoid, mylohyoid and digastric (anterior belly) muscles, and its floor is made up of the hyoglossus and superior pharyngeal constrictor muscles (figs. 1, 3, 5, 7).

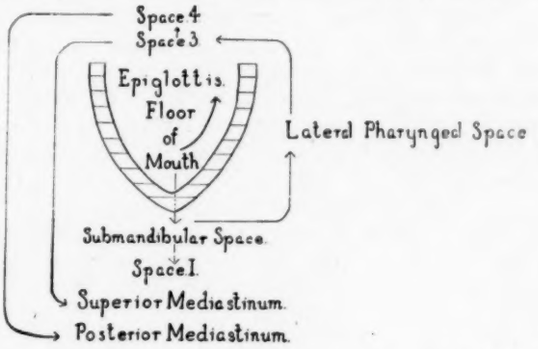


Fig. 7.—Routes of spread of infection by fascial spaces in Ludwig's angina.

In is infected from carious lower molar teeth or from injury to the mucous membrane of the floor of the mouth, by direct extension. The term Ludwig's angina should be reserved, in my opinion, to this type of infection, spread by fascial planes and not by lymphatics. The infection may spread from the submandibular space to the lateral pharyngeal space and to space 3 by direct continuity. From space 3 it may extend inferiorly to the superior mediastinum or go

13. Coller, F. A., and Yglesias, Luis: Infections of the Lip and Face, Surg., Gynec. & Obst. **60:** 277 (Feb., No. 2A) 1935; The Relation of Spread of Infection to Fascial Planes in the Neck and Thorax, Surgery **1:** 323 (March) 1937.
14. Juvara, Ernest: Anatomie de la région ptérygo-maxillaire, Thesis, Paris, No. 186, 1895.
15. Singer, Edward: Fasciae of the Human Body and Their Relation to the Organs They Envelop, Baltimore, Williams & Wilkins, 1935.
16. Merkel, F. S.: Ueber die Halsfaschien, in Merkel, F. S., and Bonnet, R.: Anatomische Hefte, Wiesbaden, J. F. Bergmann **1:** 77, 1892.
17. Charpy, Adrien, Aponeuroses de cou, in Poirier, Paul and Charpy, Adrien: Traité d'anatomie humaine, Paris, Masson & Cie **2:** 258, 1912.
18. Mosher, H. P.: Deep Cervical Abscesses and Thrombosis of the Internal Jugular Vein, Laryngoscope **30:** 365 (June) 1920.

through the alar fascia into space 4, from which it may spread inferiorly to the posterior mediastinum. It is this relationship to the superior and the posterior mediastinum that makes Ludwig's angina so dangerous. Aside from suffocation due to edema of the glottis and tongue, mediastinitis is the most common cause of death in this condition. The edema of the glottis may result from submucous spread of the infection to the larynx or between the genioglossus and geniohyoid muscles to the epiglottis (figs. 5, 7).

The dangers of suffocation and mediastinitis are best avoided by early and adequate drainage. Incision may be made vertically in the midline or transversely below the body of the mandible, or a combination of the two methods may be used. The midline incision is indicated for obvious collections in the submental region, but it often fails to drain adequately collections lying more laterally. The lateral incision is more effective in the majority of cases. It must include excision or displacement of the submaxillary gland (Colp[19]) and may well be combined with the median incision. In any event, the opening must be carried deeply to, but not through, the mucous membrane of the floor of the mouth (figs. 1, 3, 5). Spread of the infection to the superior or posterior mediastinum demands additional drainage by cervical or dorsal mediastinotomy as described.

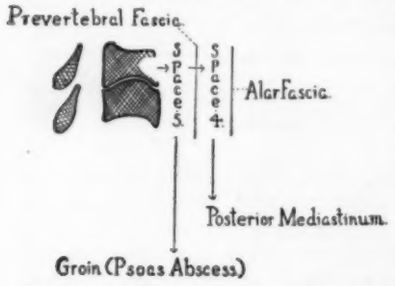


Fig. 8.—Routes of spread of infection by fascial spaces in chronic retropharyngeal abscess.

### SUMMARY AND CONCLUSIONS

1. The early recognition and proper management of Ludwig's angina, retropharyngeal abscess and other deep abscesses of the head and neck call for thorough knowledge of the anatomy of the regions concerned as well as for adequate surgical judgment and skill.

2. The seriousness of these conditions lies in their tendency to spread along fascial planes and invade the thorax with the production of mediastinitis.

3. A study of the fasciae and fascial spaces of the head, neck and adjacent regions was made. This was based on dissection, injection and section of ninety-five adult cadavers and five full term fetuses.

4. The spaces involved in Ludwig's angina, retropharyngeal abscess and other deep abscesses were observed and the possibilities of spread noted.

5. The location of surgical incisions for drainage of these abscesses, based on the spaces involved, were determined.

107 South Seventeenth Street.

### ABSTRACT OF DISCUSSION

DR. FREDERICK A. COLLER, Ann Arbor, Mich.: Dr. Grodzinsky has drawn to our attention a very important surgical problem. Infection in the face and neck spreads in three ways. It may spread through the blood stream, through the lymphatics or in continuity along fascial planes. For clinical purposes, fascia may be divided into two groups: first, that which surrounds muscle and which is attached to bone—the musculofascial type, which tends to limit the spread of infection; second, the fascia that surrounds the viscera and blood vessels, which tends to diffuse infections as blood vessels pass from one part of the body to another. Dr. Yglesias and I described three fascial spaces in the face: the space of the body of the mandible, the masticator space and the parotid space. The space of the body of the mandible is infected usually through abnormal teeth and there is frequently an osteomyelitis of the horizontal ramus associated with it. This space is easily drained by an incision through the mucous membrane of the vestibule or by an incision through the skin along the inferior border of the body of the mandible. The masticator space extends upward from this and in it lie the ascending ramus of the mandible with the masseter muscle and pterygoid muscle. It is continued upward on both sides of the temporal muscle. Either the superficial or the deep temporal pouch may be involved. This can easily be drained along the anterior border of the masseter muscle, and the temporal spaces can be drained by a vertical incision placed posterior to the frontal process of the malar bone. The third fascial space is occupied by the parotid gland, and this can be drained easily by the method of Blair. It should be emphasized that the parotid gland may be infected secondarily to an infection in the lateral pharyngeal space, or infection may pass from the parotid to this space. Dr. Grodzinsky stressed the possibility of infection spreading from the lateral pharyngeal space to the potential spaces underneath the tongue. Our anatomic studies do not corroborate this and we feel that the term Ludwig's angina should be limited to infections in the spaces between the mylohyoid and the geniohyoid or between the geniohyoid and the genioglossus muscles. These spaces can be drained internally if they present there or externally should should they present in the submental region. In draining the lateral pharyngeal pouch, we prefer to lift the deep portion of the parotid gland and pass anterior to the carotid sheath rather than to use the method described by Mosser and discussed by Dr. Grodzinsky; that is, to introduce the drain along the submaxillary gland.

DR. LOUIS J. BIRSNER, St. Louis: Many years ago I realized the hopelessness of presenting these complex problems. To simplify it I made a series of photographs of the human body, in which I was able to trace in twenty-four photographs the fascial planes from the skin inward and from the base of the skull downward to the mediastinum. I will show a series of slides, which are made in the most simple manner, so that every one can follow them and readily remember what is illustrated. The incision along the anterior border of the sternomastoid high in the neck is still the best surgical approach in the majority of cases to deep pus in the neck. Using a gloved finger and having the surgical judgment to complete the job, in 90 per cent of the cases, if deep pus is there one will find it in this approach. Behind the posterior border of the sternomastoid high in the neck is the best place to approach pus, tuberculous pus and pus from caries of the body of the second cervical vertebra. In the lower part of the neck along the anterior border of the sternomastoid is the best approach to the upper mediastinal infections. I was able to drain an upper localized, walled-off mediastinal abscess by a long incision following the posterior border of the sternomastoid, separating the clavicular attachment of the sternomastoid and dividing the omohyoid muscle. By displacing the carotid sheath and its contents anteriorly I was able to palpate this mass in the mediastinum from above and rupture it. With my hand in place I directed a long uterine dressing forceps with a Penrose rubber dam into this mass and kept it in place for three weeks. This child is living and well today.

19. Colp, Ralph: Treatment of Deep Infections of the Submaxillary Triangle, S. Clin. North America **13**: 315 (April) 1933.

**The Right to Health.**—As comparatively short a time ago as 1874, Sir John Erichson stated as his opinion that "the abdomen, the chest and the brain would be for ever shut from the intrusion of the wise and humane surgeon," but no one would venture an opinion today as to where a boundary line is to be drawn. As long as disease exists it is our duty, and the duty of those working in allied sciences, to find a means of prevention, or a better remedy. Our patients claim the right to health and we cannot, we dare not, break faith with them.—Robarts, H. H.: If Health be Wanting, *Edinburgh M. J.* **46**:725 (Nov.) 1939.

# REGENERATION OF EPIPHYSIAL CENTERS OF OSSIFICATION

## FOLLOWING DESTRUCTION BY PYOGENIC OR TUBERCULOUS INFECTION: REPORT OF FIVE CASES

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WILLIAM KRIGSTEN, M.D.
AND
EDWARD L. COMPERE, M.D.
CHICAGO

Infection of the epiphysis of a long bone is usually secondary to suppurative arthritis or osteomyelitis of the adjacent metaphysis. Rarely the epiphysis may be the site of primary hematogenous infection.

In adults and older children the contacted articular cartilage is frequently destroyed in pyogenic arthritis, exposing the epiphysial bone, which becomes secondarily infected and predisposes to ankylosis. The cartilaginous portion of the epiphysis in young children is relatively thick as compared to the osseous center, so that even extensive cartilage absorption may not expose the ossification center, and ankylosis is less common. But if such a center of ossification is infected, it may be partly or completely destroyed, while the thick cartilaginous portion of the epiphysis is preserved to a greater or lesser degree. Destruction of the osseous center is particularly apt to occur if the infection interferes with its blood supply, as may be the case when the round ligament is destroyed. The remaining cartilaginous portion of the epiphysis may collapse, resulting in a flattened and deformed epiphysis. A center of ossification may subsequently reappear with partial or complete restoration of the bony epiphysis and more or less continuation of longitudinal growth of the shaft. These changes are illustrated by the following five cases:

### REPORT OF CASES

CASE 1.—E. A. S., a girl baby aged 17 days, was admitted to the outpatient department of the University of Chicago Clinics June 17, 1929. Examination revealed a large fluctuant and tender swelling of the right knee of one day's duration. A roentgenogram showed erosion of the distal medial metaphysial region of the right femur, in the center of which was an area of increased density. A diagnosis of acute osteomyelitis was made. The abscess was incised and Staphylococcus aureus was cultured from the pus obtained. An associated pyarthrosis subsided after repeated aspiration. A similar type of infection developed in the right shoulder joint, which was also incised and drained. All drainage had ceased after two and a half months and the patient used the knee and shoulder through a functional range of motion. Sept. 18, 1931, there was a moderate degree of lateral bowing of the leg, but the range of motion was normal. The patient was not seen again until July 8, 1936, at which time she complained of recurrent pain in the right shoulder with loss of function. Roentgenograms showed osteomyelitis of the right humerus, which was successfully treated by surgery. Unfortunately roentgenograms were not obtained of the right femur, but on physical examination the leg appeared straight and the function of the knee was normal. However, roentgenograms taken May 6, 1939, showed a remarkable recovery of the right femur with complete development of the ossification center of the lower femoral epiphysis and continuation of longitudinal growth of the shaft. The legs were equal in length and the patient's gait was normal.

This study was aided by a grant from the Douglas Smith Foundation for Medical Research.

From the Division of Orthopaedic Surgery, Department of Surgery, the University of Chicago.

Read before the Section on Orthopedic Surgery at the Ninetieth Annual Session of the American Medical Association, St. Louis, May 17, 1939.

Owing to lack of space, this article is abbreviated in THE JOURNAL by the omission of illustrations for cases 3, 4 and 5; these will appear in the authors' reprints.

A roentgenogram (fig. 1 *A*) taken at the age of 5 weeks revealed extensive destruction of the distal medial portion of the metaphysis of the right femur, with marked periosteal new bone formation. The epiphysial shadow, centrally placed, was well shown.

A roentgenogram (fig. 1 *B*) taken at the age of 9 months showed extensive reparative change in the distal end of the femur. There was, however, definite shortening of the diaphysis on the medial side. The distal extremity of the metaphysis, which represented the location of the epiphysial cartilage plate, sloped sharply upward and medially. The ossification center of the distal lateral condyle of the femur was well preserved, but no osseous center could be demonstrated for the medial condyle. Judging from the x-rays, the inflammatory process had extended across the epiphysial cartilage plate, involving not only the metaphysial region of the shaft but also the epiphysis, with resultant growth retardation of the mesial half of the metaphysis.

A roentgenogram (fig. 1 *C*) taken at the age of 19 months showed a center of ossification in the epiphysis of the medial condyle. Growth was definitely taking place from the epiphysial cartilage plate completely across the diameter of the shaft, but the sloping deformity of the epiphysial line was still present and a bow-leg deformity persisted.

The roentgenogram (fig. 2) taken ten years after the onset showed a complete regeneration of the ossification center of the distal femoral epiphysis with an open but irregular epiphysial line and correction of the varus deformity of the knee. The distal third of the shaft was broadened and the mesial half of the epiphysis slightly reduced in size, while the lateral portion was somewhat enlarged as compared to the normal left femur.

It cannot be definitely stated whether or not the medial portion of the epiphysial center was actually destroyed by pyogenic infection or became absorbed as a result of disturbed blood supply resulting from the extensive involvement of the metaphysis. Since there was an osteomyelitis of the shaft and pyarthrosis of the knee joint, it would seem logical to assume that the infection had involved the mesial portion of the epiphysis and had caused sufficient destruction so as to interfere with its ossification and to some extent with longitudinal growth. Some time after healing of the osteomyelitis, a bony center appeared and longitudinal growth was resumed. This progressed to complete regeneration of the epiphysis and restoration of normal accretion of bone length from the epiphysial plate, as shown by figure 2.

CASE 2.—R. V., a boy aged 1 year, was first seen Sept. 7, 1932, six months after the onset of an acute pyogenic arthritis of the left hip. The infection had gradually subsided without surgical intervention. Examination on admission revealed some pain on extreme ranges of motion, but there was no palpable swelling or muscle spasm, and the two extremities were of equal length.

A roentgenogram (fig. 3 *A*) taken September 15 showed complete absence of a center of ossification for the capital epiphysis of the femur. There was a slight lateral luxation of the hip, but the space from the proximal end of the neck of the femur to the superior portion of the acetabulum was not markedly diminished, suggesting that it was filled by a remnant of unossified epiphysis. There was slight shortening of the neck with a cup-shaped shadow of reduced density outlined by a narrow zone of increased density extending downward into it.

Because of tendency to subluxation, a shelf operation was then performed by the implantation of two tibial bone pegs. Fourteen months after the operation roentgenograms (fig. 3 *B*) revealed an adequate acetabulum with further relative shortening of the neck, and a faint shadow of ossification was present proximal to it in what remained of the head.

On examination at the age of 7 years the patient had no pain but walked with a mild limp, which resulted in part from the shortening of the leg of approximately 2 cm. The range of motion was complete and the hip was stable. A roentgeno-

gram (fig. 4) revealed a moderate coxa vara with shortening of the neck of the femur but with a remarkable degree of regeneration of the center of ossification of the capital epiphysis. It was of normal breadth at the base but was reduced approximately one half in height. The epiphysial line was irregular and apparently closed in its lateral portion. The acetabulum was slightly irregular and increased in obliquity in its iliac region. The neck was shortened and the greater trochanter was high with irregularity and narrowing of its epiphysial line,

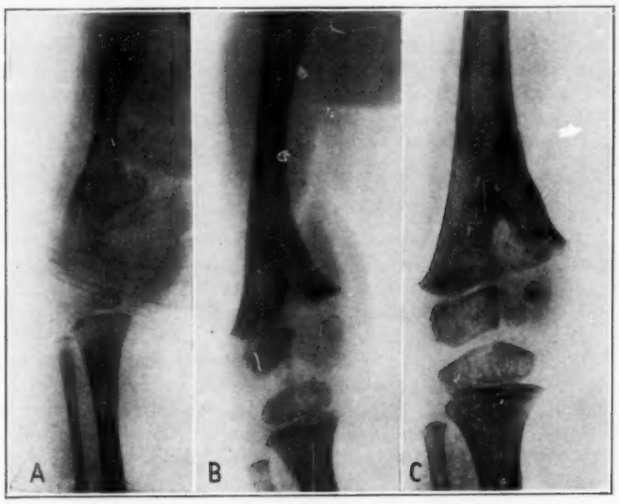


Fig. 1 (case 1).—*A*, three weeks after onset of acute osteomyelitis of right femur: extensive destruction of metaphysis with periosteal new bone formation and the bony center of epiphysis centrally placed; *B*, eight and one-half months after onset: reparative changes in, but shortening of, medial side of diaphysis and absence of ossification center for medial condyle of femur; *C*, eighteen and one-half months after onset: further repair of shaft and reappearance of bony center of medial half of epiphysis.

as compared with the other side. The cartilage space of the joint was increased in width about 50 per cent over that of the opposite normal hip. Apparently there had been some longitudinal growth of the shaft through the epiphysial line of the neck.

CASE 3.—M. B., a girl aged 7½ years, a patient of Dr. Philip Lewin, was first seen in consultation Feb. 29, 1933, because of a progressive shortening of the right leg. The hip joint had been incised at the age of 7 weeks because of suppurative arthritis, and drainage had continued for several months. She began to walk at 16 months without pain or noticeable limitation of motion. The involved extremity became progressively shorter than the left during the ensuing four years and necessitated a raise on the right shoe.

Examination revealed slight limitation of motion in the right hip, but there was no pain or swelling.

A roentgenogram (fig. 5 *A*) taken four and one-half months after the onset of the symptoms when the patient was 6 months of age showed extensive bone destruction in the metaphysial region of the right femur, complete absence of a center of ossification for the capital epiphysis and an apparent lateral displacement of the upper end of the femur from the acetabulum.

Roentgenograms at the age of 9 months (fig. 5 *B*) showed marked repair of the lesion in the metaphysis with the regeneration of a small fragment of the neck but without reappearance of the center of ossification.

However, at the age of 18 months a faint shadow of beginning ossification in the region of the capital epiphysis was observed in the roentgenogram (fig. 5 *C*).

Another roentgenogram (fig. 6 *A*) at the age of 2 years and 7 months showed a spurlike shadow of regenerated inferior portion of the neck (*x*) with enlargement of the shadow in the mesial portion of the head above it (*y*) and also a shadow of a center of ossification in the region of the greater trochanter (*z*), which was irregular as a result of growth disturbance and lay directly above the shaft with the epiphysial line running transversely.

At the age of 5 years and 8 months (fig. 6 *B*) these centers of ossification had enlarged and fused, while the deformed neck was bent downward into a position of coxa vara. The epiphysial line below the deformed fused epiphyses of head and greater trochanter was irregular and curved upward and outward. There was an incomplete line of reduced density demarcating the regenerated mesial from the lateral portion of the neck.

A subtrochanteric osteotomy was performed at the age of 9 years and healing obtained with the shaft in abduction.

A roentgenogram at the age of 12 years and 9 months (fig. 6 *C*) showed obliteration of the wavy epiphysial line between the fused head and greater trochanter proximally and the neck and lateral portion of the shaft distally. The head was relatively small and deformed, but there remained only a moderate coxa vara.

Because teleroentgenographic measurements at the age of 8 years revealed shortening of the right leg of 6.5 cm., an epiphysiodesis was performed on the left lower femoral epiphysis. In spite of this attempt to equalize the length of the legs, three years later the left leg was still 6 cm. longer than the right. Since the patient was then 11 years old a surgical arrest of the upper and lower left tibial and fibular epiphyses was done. Subsequently she increased little in height and at the time of the last examination, at the age of 12 years and 9 months, the right leg was still 4 cm. shorter than the left. However, the patient's gait and appearance were considerably improved.

CASE 4.—R. G., a girl aged 2 years, was first seen July 3, 1930, eight weeks after the onset of an acute pyogenic infection of the right hip. A fluctuant mass over the medial aspect of the joint had been incised and drained. Examination on admission revealed an incision 2 cm. in length over the right hip, exuding a purulent drainage which ceased ten days later. A roentgenogram ten days after admission (fig. 7 *A*) showed lateral displacement of the head of the right femur with the shadow of the capital epiphysis irregularly reduced in size and a cup-shaped loss of bony shadow in the juxta-epiphysial region of the neck. The shadow of acetabular cortex of the ilium was moderately reduced in density and slightly more oblique than that of the opposite hip.

Fig. 2 (case 1).—Ten years after onset: complete regeneration of ossification center of the distal femoral epiphysis with an open but irregular epiphysial line and correction of the varus deformity.

Twenty-six days after admission the right hip joint was exposed; the capsule was relaxed and distended and the round ligament was gone. A sinus extended into the center of ossification of the head at the fovea, and through this opening it was possible to curet and remove a portion of the dead bony center. The hip was held in an abduction cast for one month. Microscopic examination showed pyogenic inflammatory tissue and guinea pig inoculation was negative for tuberculosis.

Roentgenograms (fig. 7 *B*) one month after the operation showed further loss of the shadow of the center of ossification and depression of it into the cup-shaped defect in the neck. The

remaining portion of bony head now appeared to have a relatively greater density than that of the surrounding living bone, indicating that it was necrotic. There was evidence of beginning repair of the bone in the metaphysial portion of the neck. The sinus healed six weeks later, when walking was begun.

Roentgenograms (fig. 8 *A*) eleven months after the onset showed complete disappearance of the devitalized remnant of the capital epiphysis, a broad short neck and a sloping, irregular acetabulum in the iliac region.

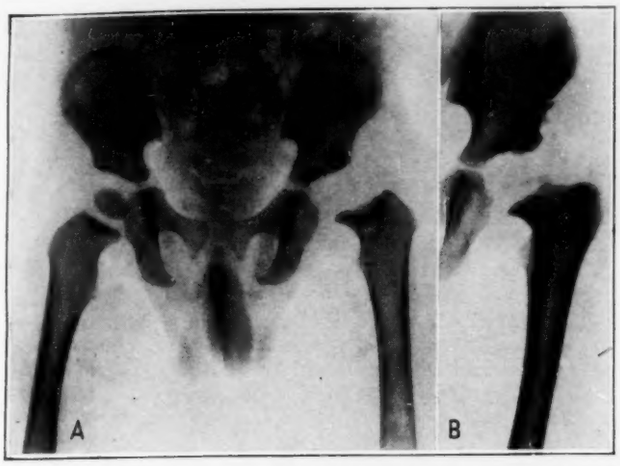


Fig. 3 (case 2).—*A*, six and one-fourth months after onset of acute pyogenic arthritis: absence of ossification center for left capital femoral epiphysis and cup-shaped defect in metaphysis; *B*, twenty-one months after onset: relative shortening of neck and beginning reossification of epiphysis.

A roentgenogram (fig. 8 *B*) twenty-two months after the onset showed a faint shadow of a bony center in the flattened deformed epiphysis at the top of the shaft.

Examination of the patient twenty-six months after the onset showed the involved extremity to measure 2 cm. shorter than the left. A roentgenogram (fig. 8 *C*) then revealed further regeneration of the center of ossification of the capital epiphysis. During the subsequent years the hip became progressively more prominent and the limb shorter than the left.

Five and a third years after the onset a roentgenogram (fig. 8 *D*) revealed a triangular shadow of a capital epiphysis, thickest at its superior portion and narrowing progressively downward, where it terminated in a thin layer short of the lower end of the irregular epiphysial line. The neck of the femur was markedly widened and shortened, indicative of retardation of longitudinal growth. The oblique acetabulum not longer accepted the deformed head of the femur, which had a tendency to subluxate.

At the age of 8 years there was 3.5 cm. difference in length between the legs, and since this discrepancy was increasing an epiphysiodesis of the lower end of the normal left femur was performed. At the age of 10 years and 8 months the right greater trochanter was prominent and displaced upward, but the difference in length of the two limbs was then only 1.5 cm. However, the operation of epiphysiodesis promises to give equalization of limb length by the time longitudinal growth ceases. The patient walked well and without pain, although there was still some limp. Flexion was possible to 110 degrees, but extension was limited short of 20 degrees and abduction was possible through an arc of only 20 degrees. A roentgenogram at that time (fig. 9) showed apparent fusion of the deformed neck and capital epiphysis and a shallow, oblique and inadequate acetabulum. The greater trochanteric epiphysis had grown upward past the level of the midportion of the acetabulum and showed evidence of premature fusion, as is seen in cases of slipped femoral epiphysis and subsequent fusion with the neck.

The loss of the center of ossification of the capital epiphysis in this case was definitely established at operation. However, the cartilaginous portion of the epiphysis was preserved in a flattened condition. The intermediary growth cartilage was involved to such a degree that longitudinal growth of the neck was considerably interfered with, in spite of the fact that subsequently an irregular flat bony center reappeared and enlarged in the epiphysis itself.

CASE 5.—T. C., a girl aged 2 years, was first seen April 4, 1929, after she had refused to walk for three weeks because of pain in the left hip. Examination revealed tenderness over the hip and pain on forced extension and internal rotation. The joint was aspirated but no pus was obtained. Roentgenograms (fig. 10 *A*) showed partial absorption of the ossification center of the capital epiphysis and a mottled appearance of the juxta-epiphysial region of the neck of the left femur.

The hip was immobilized in a plaster cast and four and one-half months later a roentgenogram (fig. 10 *B*) showed further absorption of the ossification center of the capital epiphysis and a portion of the remainder had a relatively greater density than the surrounding bone, suggesting that it was necrotic. The epiphysis had been slightly depressed into a cup-shaped area of destruction in the metaphysis. There was a broad central streak of decreased density extending downward in the neck and first part of the shaft with finely stippled increase of density within its lower portion.

The patient was not seen again until March 7, 1931, when she was 4 years of age. A roentgenogram (fig. 11 *A*) then revealed almost complete absorption of the ossification center of the capital epiphysis but some evidence of repair of the lesion in the upper end of the shaft. The neck was somewhat shorter and broader than that of the normal side, indicating growth retardation at the epiphysial plate, which had assumed a horizontal position.

Immobilization of the hip in plaster was continued and a roentgenogram (fig. 11 B) taken at the age of 4½ years showed further evidence of repair with an increase in the amount of ossification in the capital epiphysis. There was a tendency for the externally rotated and broadened upper end of the femur to subluxate, although the acetabulum appeared normal.

Examination at the age of 5 years and 8 months revealed marked limitation of motion of the hip joint, but the legs were equal in length. A roentgenogram (fig. 12 *A*) showed almost complete reformation of the ossification center of the capital epiphysis, although it was not as large as that of the nondiseased but somewhat flattened head on the other side. The epiphysial

Fig. 4 (case 2).—Six and one-half years after onset: remarkable regeneration of osseous center of capital epiphysis but moderate coxa vara.

line was slightly V shaped, indicative of interference with longitudinal growth in its central portion. The cystlike areas in the neck had been almost completely replaced by normal-appearing bone.

A biopsy was performed Dec. 19, 1932, when the patient was 5 years and 9 months old. The head of the femur was found to be anteriorly dislocated but the articular cartilage was well preserved. The synovial lining appeared normal and a portion removed was subsequently shown to be negative for tuberculosis by microscopic examination and guinea pig inoculation. After the capsular incision was closed, the shaft

of the femur below the greater trochanter was exposed and was found to contain pus and thick, cheesy, inspissated material which, by the foregoing tests, proved to be tuberculous. Both incisions healed by primary intention.

When she was 7 years old the anterior portion of the acetabulum was reinforced by the implantation of a full thickness bone peg taken from the lower end of the shaft of the left femur, where also an osteotomy was performed in an effort to correct the external rotation of the limb.

Roentgenographic studies (fig. 12 *B*) at the age of 9½ years showed little evidence of improvement in the position of the hip but complete regeneration of the ossification center of the capital epiphysis. Longitudinal growth was definitely occurring from the slightly V-shaped epiphysial plate of the neck and also from the greater trochanter.

The patient was last examined Feb. 7, 1939, at the age of 12 years. The hip was painless and the gait was good in spite of 1.5 cm. shortening of the left leg. Flexion and abduction was limited but could be increased by internal rotation of the extremity. Roentgenograms (fig. 12 *C*) showed complete regeneration of the ossification center of the capital epiphysis but little improvement in the inadequate acetabulum and position of the hip. Longitudinal growth had apparently occurred completely across the epiphysial plate of the neck and also from the greater trochanter, as evidenced by the increase in length of the neck and relative upward displacement of the greater trochanteric epiphysis. The epiphysial line between the head and the neck now appeared to be undergoing premature closure.

The extensive destruction of the center of ossification of the head of the femur in this case was the result of direct invasion of the tuberculous process from the neck of the femur. Owing to some fortuitous circumstance, this did not break through the articular cartilage or neck and involve the hip joint. Regeneration of the osseous center of the epiphysis occurred almost simultaneously with improvement of the condition of the neck. The subsequent growth in length of this extremity has been relatively normal, indicating that growth may continue, although a part of the central portion of the epiphysial cartilage plate has been destroyed.

### COMMENT

The preceding clinical cases illustrate the capacity of the ossification centers of epiphyses of young children to regenerate after they have been partly or completely destroyed from extension by continuity of pyogenic or tuberculous infections. This ability to regenerate the bony centers appears to be directly related to the amount of cartilage that survives. Varying degrees of longitudinal growth of the shaft took place through what remained of the epiphysial cartilage plate. The exact extent of the injury to the various components of the epiphysis could not always be determined by roentgenographic examinations. In case 1 the cartilage of the mesial half of the lower femoral epiphysis was undoubtedly preserved, although the ossification center was completely lost and longitudinal growth of the corresponding portion of the shaft was temporarily retarded. Subsequently the center in the epiphysis and longitudinal growth of the shaft were restored to normal. In case 3 the center of ossification of the capital femoral epiphysis became necrotic and was removed, partly by operation and partly by absorption. Most of the cartilaginous portion was found at operation to be preserved but flattened. In all cases the persistence of a broad space in the epiphysial region, which did not cast a shadow of bony density in the roentgenograms, was indicative of the preservation of cartilage and this assumption was verified by the subsequent appearance of centers of ossification.

### CONCLUSION

1. Epiphysitis in four young children, produced by pyogenic organisms, resulted in partial to complete destruction of the centers of ossification but with preservation of varying amounts of the cartilaginous portions. Subsequently in each case there was reappearance of a bony center with progressive growth and ossification of the remaining cartilaginous epiphysis.

2. Marked destruction of the bony center of the capital epiphysis with subsequent reossification was observed in one case of tuberculosis, primary in the neck of the femur.

3. Longitudinal growth of the shaft continued in each case. This indicated a remarkable degree of preservation of the growth cartilage disk in the presence of extensive destruction of the epiphysis itself.

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## ABSTRACT OF DISCUSSION

DR. WILLIS C. CAMPBELL, Memphis, Tenn.: This has been a most instructive study in the physiology of bone. The authors have demonstrated the fact that it is possible, after a severe infection and apparent destruction of the epiphyses, to have the formation of new epiphyses. Whether there is a formation of a new epiphysis or whether it is due to the remainder of the old epiphysis cannot be determined, but from that practical point this has been demonstrated in five cases. These conditions are somewhate analogous to osteomyelitis under the age of 3, in which there may be complete regeneration after extensive destruction; the entire shaft may be replaced by normal bone. Also in the very young there may be a complete replacement of a necrotic head, which is not possible after the age of 12, when the head will remain indefinitely as a necrotic mass, often with persistent drainage. In coxa plana the head may be completely restored to normal size and shape, even after complete separation of the upper femoral epiphysis. These cases also demonstrate two important physiologic factors, functional adaptation and inherent reproduction of form, nature's habit of the restoration of a part of the same pattern as normal. Case 1 illustrates correction of bowing by epiphysial growth. Normal length of the femur also was obtained. Correction by growth has been demonstrated even after severe deformity as a result of fracture by some of the authors of this paper, but in these the epiphyses were normal, while in those under discussion there had been apparent destruction. In case 5 the cause was in all probability tuberculosis, which was demonstrated microscopically as an extra-articular lesion, close to but not within the epiphysis. Normal growth after an invasion of an epiphysis by the tubercle bacillus is exceedingly rare. I have often observed a reformation of the neck of the femur after its apparent destruction in the roentgenogram. This has not been observed after total destruction of the epiphysis from a radiographic standpoint. This is partly due to the fact that I have not seen my cases as early after the infection as the authors have, as my cases are largely from rural communities while those of the authors were from Chicago, which made early treatment possible.

DR. J. ALBERT KEY, St. Louis: I think that this paper should be entitled "Survival and Growth of Remnants of Epiphysial Cartilage Plate" rather than regeneration. Bone is destroyed in the presence of an infection, especially a pyogenic infection, while cartilage tends to survive. If that were not true, in pyogenic osteomyelitis the epiphysial line adjacent to the focus in the metastasis would be gone early in the disease and cessation of growth would occur. These roentgenograms show the destruction of bone but they do not give any evidence as to what is happening to the cartilage and it is the cartilage that grows. The cartilage tends to survive because of its lack of circulation and it offers a barrier to the progress of the infection and may derive its nutrition from either side. The younger the patient the more regeneration may be expected. I also want to point out that these are five cases out of a very large number of infections of the hip which have been seen in the University of Chicago Clinic. These are the exception and not the rule.

The epiphysial line is very fickle. Epiphysial fusion and growth disturbance may occur when one least expects it. The epiphysis can be insulted and it may continue to grow, but it must be treated with respect and this must not be taken as evidence that as a rule one is going to get not regeneration but partial survival and continued growth.

DR. WILLIAM N. KRIGSTEN, Chicago: These cases were taken from Dr. Phemister's collection and they do cover a number of years and, as Dr. Key says, they are not the ordinary occurrence. They do happen but not very often and we do not know for sure whether it is entirely regeneration or just repair.

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## EXPERIMENTAL PERITONITIS: ITS PREVENTION BY ROENTGEN IRRADIATION

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AND
H. C. JONES, M.D.
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DETROIT

No postoperative peritonitis occurred in fifty-one consecutive cases of resection for carcinoma of the rectum and rectosigmoid reported by Pratt,[1] of the Henry Ford Hospital, with one exception, when an operative error in the selection of the point of ligation of the vessels resulted in extensive gangrene and sloughing of the colon and in peritonitis. It was noted that all of these patients had received from one month to six weeks preoperatively an erythema dose of high voltage roentgen therapy to each of four ports of the pelvis and the lower portion of the abdomen, primarily for the purpose of decreasing the size of the tumor mass and protecting against metastases. It was estimated that approximately one erythema dose reached the midpelvis. These observations suggested to us that the irradiation may have been responsible at least in part for the protection against peritonitis and stimulated us to investigate the role of roentgen therapy in the prevention of experimental peritonitis in laboratory animals.

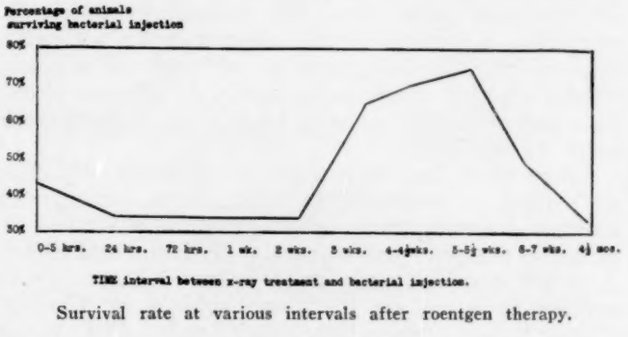
At intervals during the past year forty-two full-grown rabbits were given 630 roentgens, approximately 90 per cent of a human erythema dose of x-rays, in a single application over the entire anterior aspect of the abdominal wall. The treatment factors were as follows: voltage 200 kilovolts, rate 25 milliamperes, filter 0.5 mm. of copper with 1 mm. of aluminum, skin target distance 50 cm. and intensity 42 roentgens per minute. All of the animals withstood this treatment with no obvious ill effects other than occasional diarrhea.

With the subject under drop ether anesthesia the abdominal wall and the intraperitontal fluid were examined before and after the roentgen treatment. Twenty-four and, more noticeably, forty-eight hours after the application of x-rays over the abdomen, the tissues were found to be markedly hyperemic, the vessels being dilated and engorged. The entire thickness of the anterior abdominal wall was two to three times greater than before. This thickening was principally due to edema of the muscle layers, although the edema extended into the subcutaneous and subserosal layers of the abdominal wall as well. Little cellular infiltration was seen in the abdominal wall, but occasionally areas of eosinophilic infiltration were noted. The blood vessels were dilated and engorged. With the exception of the marked edema and congestion, there was nothing remarkable in the sections studied.

Fluid was aspirated from the dependent portions of the abdominal cavity of animals treated with x-rays and of controls. In those not treated, the fluid was slightly opalescent, viscid and scanty. Microscopically, numerous granular white blood cells and epithelial cells were seen, but no red cells. In those which were treated with roentgen rays forty-eight hours previously the fluid was increased in amount, pink and more viscid and contained flakes of fibrin. Microscopically, numerous red blood cells were seen, but otherwise the cellular content was very similar to that of the untreated animals.

Four weeks after the roentgen treatment, the anterior abdominal wall had shrunk to approximately normal thickness but the peritoneum appeared more opalescent than normally. The excess in peritoneal fluid had disappeared at this time, and no blood was visible.

At varying intervals after the roentgen therapy, these animals were given a single intraperitoneal injection of 3 cc. of a four to seven day brain broth culture of virulent bacteria. This culture was obtained in a fatal case of peritonitis and it consisted of Bacillus coli, aerobic nonhemolytic streptococcus, Bacillus pyocyaneus, Bacterium melaninogenicum, anaerobic streptococcus, and Clostridium sporogenes. Judging from a previous study,[2] this culture was rather typical of severe acute perforated appendicitis with peritonitis.




Survival rate at various intervals after roentgen therapy.

As can be seen in table 1, the majority of these bacteria when injected in pure culture were capable of producing only minimal or no local lesions and did not cause fatal peritonitis in guinea pigs and rabbits.

On the other hand, a similar injection of a mixed culture of these same bacteria produced subcutaneously extensive areas of cellulitis or gangrene and intraperitoneally overwhelmingly fatal peritonitis. This mixed culture was therefore used because of the synergistic pathogenic action of these bacteria.

A dose of 0.5 cc. of this mixed culture injected intraperitoneally produced death in control rabbits in from twenty-four to forty-eight hours. A dose of 3 cc. produced an overwhelming peritonitis in from twelve to fifteen hours in the control animals.

After intraperitoneal inoculations of 3 cc. of this culture into seventeen rabbits treated from four to seven weeks previously with high voltage roentgen therapy twelve, or 70 per cent, survived, while five died. Of a similar control group not treated by x-rays, all died after the same injection.

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Read before the Section on Radiology at the Ninetieth Annual Session of the American Medical Association, St. Louis, May 17, 1939.

1. Pratt, J. P.: One Stage Operation for Resection of Rectosigmoid and Rectum for Carcinoma (With or Without Hysterectomy), Am. J. Obst. & Gynec. **36**: 209-218 (Aug.) 1938.

2. Altemeier, William A.: The Bacterial Flora of Acute Perforated Appendicitis with Peritonitis, Ann. Surg. **107**: 517-527 (April) 1938.

A series of experiments was then carried out to determine the survival rate of animals inoculated at various intervals after the roentgen therapy.

When translated into a curve (as in the accompanying chart) these results showed that a small amount of protection is immediately imparted by irradiation.

TABLE 1.—*Pathogenicity of the Bacteria in Pure and Mixed Culture*

| | Results of Injection | | | |
|---|---|---|---|---|
| | Pure Culture | | Mixed Culture | |
| Bacteria | Subcutaneous | Intraperitoneal | Subcutaneous | Intraperitoneal |
| B. coli | Negative | Negative | Extensive cellulitis in center of which gangrene may occur | Death in 12-15 hr. |
| Aerobic streptococcus | Negative | Negative | | |
| B. pyocyaneus | Cellulitis | Death in 48 hr. | | |
| Bacterium melaninogenicum | Slight induration | Negative | | |
| Anaerobic coccus | Local abscess | Negative | | |
| Clostridium sporogenes | Slight induration | Negative | | |

This protection remains at approximately the same level for three weeks, after which the degree of protection rises sharply, reaching its maximum from four to six weeks after the irradiation.

## COMMENT

From these experimental results it appears that high voltage roentgen therapy given from four to six weeks before the intraperitoneal injection of virulent bacteria protects from 70 to 75 per cent of the rabbits from experimental peritonitis. The manner in which this protection is brought about is obscure, but a nonspecific type of immunity is apparently produced. It is particularly difficult to understand why irradiation should have any protective action as long as six or seven weeks after its application.

Much work has been done to determine the effect of x-rays on resistance to infection in experimental animals. Among early investigators who studied the effect on antibody formation are Benjamin and Sluka,[3] Läwen [3] and Simonds and Jones.[4] Later several articles appeared on the same subject by Chovey,[5] Corper [6] and particularly Hektoen.[7] The results obtained by these workers were discordant in many particulars, but they agreed on these points: that (1) under certain conditions antibody formation may be reduced, restrained or inhibited by irradiation and (2) if antibody formation is well under way, nothing but massive doses can influence it.

The effect of roentgen treatment on the susceptibility of animals to infection has also been investigated. Kessel and Sittenfield [8] found that guinea pigs infected with tubercle bacilli and treated with x-rays lived fourteen days longer than controls. Kellert,[9] using the same kind of animals and organisms, found no increased susceptibility to tuberculosis but increased susceptibility to secondary invaders. Kellert was unable to confirm the observations of Morton,[10] who found that massive doses of x-rays shortened the lives of guinea pigs after infection with tubercle bacilli. The work of many others could be cited, but the results of most indicate that no degree of immunity to tuberculosis is conferred but that susceptibility to secondary invaders may result.

Chrom [11] studied the effect of roentgen irradiation on experimental bacteremia. Using doses of from 430 to 800 roentgens on mice, he measured the length of time required for these animals to free their blood stream from organisms as compared with controls. In no instance were the irradiated animals able to free the blood stream from organisms more quickly.

After small doses (from 10 to 75 roentgens) over the liver and spleen, Chrom [12] injected bacteria of known pathogenicity into the blood stream Studying the blood at intervals, he found no evidence of increased resistance as measured by the ability of the irradiated animals to free their blood stream of organisms more quickly than controls.

After recognition of the role of the reticulo-endothelial system in immunity, curiosity was aroused as to what effect x-rays had on this system. The rate of elimination of vital stains from the blood stream has been used to measure the functional efficiency of this system. Pohle and Davy [13] noted slight increase in the rate of elimination of the dye from the blood stream in each instance when rabbits, treated over the spleen or entire body, were given injections of trypan blue one hour later. Mischtschenko [14] determined that 100 per cent of an erythema dose given one hour before injection delayed the absorption of trypan blue from

TABLE 2.—*Result of Intraperitoneal Injection at Varying Intervals After High Voltage Roentgen Therapy*

| No. of Rabbits | Interval Between Roentgen Therapy and Bacterial Injection | Result, Inoculated Rabbits | Percentage of Animals Surviving | Result, Controls |
|---|---|---|---|---|
| 7 | 0 (immediate) | 3 survived 4 dead | 43 | All 6 dead |
| 3 | 24 hours | 1 survived 2 dead | 33 | All 3 dead |
| 3 | 72 hours | 1 survived 2 dead | 33 | All 3 dead |
| 3 | 1 week | 1 survived 2 dead | 33 | All 3 dead |
| 3 | 2 weeks | 1 survived 2 dead | 33 | All 3 dead |
| 3 | 3 weeks | 2 survived 1 dead | 66 | All 3 dead |
| 7 | 4-4½ weeks | 5 survived 2 dead | 71 | All 7 dead |
| 8 | 5-5½ weeks | 6 survived 2 dead | 75 | All 5 dead |
| 2 | 6-7 weeks | 1 survived 1 dead | 50 | Both dead |
| 3 | 4½ months | 1 survived 2 dead | 33 | All 3 dead |

3. Cited by Colwell, Hector A.: The Method of Action of Radium and X-Rays on Living Tissues, New York & London, Oxford University Press, 1935.

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13. Pohle, E. A.: The Effect of Roentgen Rays on the Reticulo-Endothelial System, Am. J. Roentgenol. **22**: 439-447 (Nov.) 1929.

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the blood stream. Pohle and Davy called attention to the marked variation in the rate of elimination of vital stains in control animals.

Kelly [15] has successfully treated a variety of infections with x-rays. In addition he has been able to prevent gas bacillus infections in crushing or compound fracture wounds by prophylactic roentgen therapy.

It must be remembered, however, that the earlier workers used low voltage and intensity, little or no filtration, irradiation of the entire body surface and unmeasured doses. On the other hand, we used 200 kilovolts, moderately heavy filtration, irradiation of the abdomen only, relatively large known doses (630 roentgens or more) with 42 roentgens intensity a minute, and longer irradiation-injection intervals.

### SUMMARY

A group of forty-two rabbits treated with approximately 90 per cent of an erythema dose was inoculated intraperitoneally with equal amounts of mixed highly virulent bacterial cultures. It was found that the degree of protection of the treated animals rose sharply three weeks after irradiation and reached its maximum between the fourth and the sixth week. A study of our experiments and a review of the literature have failed to explain the manner in which this protection is brought about.

In the clinical series of patients with carcinoma of the rectum or rectosigmoid reported by Pratt, an interval of from four to six weeks elapsed between the time of roentgen therapy and operation. This was the period of time arbitrarily chosen as necessary to allow the patient to recover sufficiently from any deleterious effects of the x-rays. On the basis of our experimental work, this interval seems to have been wisely chosen since it also confers the highest degree of protection from peritonitis.

### SUMMARY AND CONCLUSIONS

High voltage roentgen irradiation is valuable as an immunizing agent against experimental peritonitis in animals.

Furthermore, our observations suggest that preoperative irradiation is valuable in preventing postoperative peritonitis in human beings.

The dosage employed was 90 per cent of a human erythema dose.

The maximum degree of immunity in animals occurred from four to six weeks after the irradiation.

The manner in which this protective action is brought about is unexplained.

The experimental results presented in this paper further justify the continuation of preoperative roentgen irradiation in contemplated resections of the colon and rectum.

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### ABSTRACT OF DISCUSSION

DR. J. P. PRATT, Detroit: Many surgeons have condemned the use of preoperative roentgen therapy for malignant conditions of the pelvic organs. The reason usually stated is that the hazard of operation is increased by this procedure. My own experience is that the risks of operation are reduced. An explanation for the difference of opinion may be found in the time allowed to elapse between irradiation and operation. The difficulty and risk are increased if the operation is performed within a few days after the roentgen treatment. Waiting from four to six weeks changes the risk to protection. The authors stated that they decided on the time interval between irradiation and operation in each case. Patients were carefully observed after irradiation. There is a temporary depression of vitality, reaching the maximum on the final day of radiotherapy. Subsequently, the physical condition improves for a period of a few weeks. The appetite is better, nutrition is improved and a gain in weight is noted. The red cell count and the hemoglobin content increase. Fatigue and lassitude become less apparent. The general vigor increases. Unless the temporary improvement is anticipated and the patients are warned against a false sense of security, they may refuse operation, believing that they are already cured. Daily examinations after irradiation show an immediate swelling, edema and increased tenderness of the tissues treated. These conditions gradually subside, approaching a normal state. Judgment of the optimum time for operation is based, therefore, on two conditions: (1) the general condition of the patient and (2) the state of the local tissues. The choice of time for operation varies for individual patients but usually it has been from four to six weeks after irradiation. From the data presented, indicating that irradiation protects the peritoneum of animals against infection, it may be inferred that an analogous safeguard to operation has been provided during the four to six week interval. No satisfactory method of measuring this protection in patients is apparent, but the fact that evidence of postoperative peritonitis was not observed in the series of resections of the rectosigmoid would confirm the validity of the inference. Peritonitis was inevitable in one case in which an error in judgment led to sloughing of the bowel on account of inadequate circulation. After the affected loop of bowel is excised and the cut ends are anastomosed, the repaired bowel is returned to the pelvic cavity. Some soiling inevitably occurs. While the path of least resistance to drainage is through the posterior incision, soiling within the pelvic cavity undoubtedly occurs at the time of operation as well as subsequently. Failure of peritonitis to develop may be explained by the protection of the peritoneum through irradiation or the absence of potent organisms.

15. Kelly, J. F.: Personal communication to the authors.

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## THE PRESENT STATUS OF LIPOCAIC

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CHICAGO

The probability that the pancreas furnishes more than one internal secretion to the organism was suggested by the discovery of more than one type of cell in the islets of Langerhans. The evidence that insulin is elaborated by the beta cells of the islets is now fairly conclusive. The function of the alpha cells remains unknown. In 1924 Fisher [1] and Allan, Bowie, Macleod and Robinson [2] demonstrated that completely depancreatized dogs could not be maintained alive for long even though adequately treated with insulin. At death the most obvious change observed was an extensive fatty infiltration and degeneration in the liver. In one experiment, however, Fisher noted an extreme degree of arteriosclerosis of the aorta. The addition of raw pancreas to the diet was found by Macleod and his associates to prevent the development of these changes in the liver and to permit survival for long periods of time. These observations have been abundantly confirmed.

In 1930 Hershey [3] and in 1931 Hershey and Soskin [4] reported that the addition of 10 Gm. of lecithin daily

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These studies represent the combined work of a number of associates, including John Van Prohaska, H. P. Harms, W. A. Geer, W. C. Goodpasture, P. B. Donovan, C. W. Vermeulen and D. E. Clark.

This work has been aided by grants from the Josiah Macy Jr. Foundation, the Committee on Research in Endocrinology of the National Research Council, the Douglas Smith Foundation for Medical Research of the University of Chicago, and Eli Lilly & Co.

1. Fisher, N. F.: Am. J. Physiol. **67**: 634 (Feb.) 1924.
2. Allan, F. N.; Bowie, J. J.; Macleod, J. J. R., and Robinson, W. L.: Brit. J. Exper. Path. **5**: 75 (April) 1924.
3. Hershey, J. M.; Am. J. Physiol. **93**: 657 (June) 1930.
4. Hershey, J. M., and Soskin, Samuel: Am. J. Physiol. **98**: 74 (Aug.) 1931.

to the diet of the depancreatized dog treated with insulin was also effective in preventing damage to the liver and in permitting survival. The active constituent of lecithin in this effect was found by Best and Huntsman [5] in 1932 and by Best, Ferguson and Hershey [6] in 1933 to be choline. Raw pancreas contains both choline and the various enzymes present in pancreatic juice, and its beneficial effect in preserving the life of the depancreatized dog and in preventing the extreme accumulation of fat in the liver was attributed to one or the other of these substances. In 1936 Dragstedt, Van Prohaska and Harms [7] presented evidence indicating that the effect of the feeding of pancreas in this connection could not be accounted for on the basis of its content of choline or pancreatic enzymes but on the other hand was due to the presence of a new and

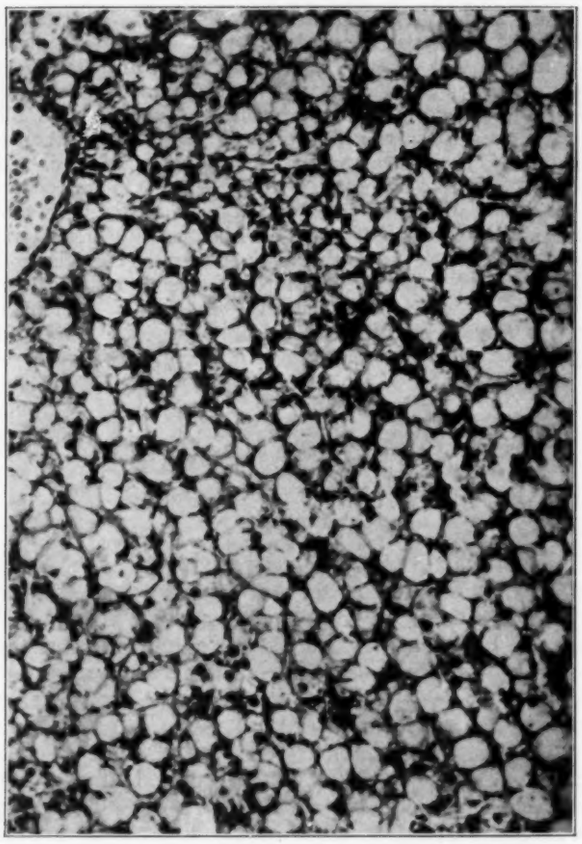

Fig. 1.—Biopsy specimen showing fatty metamorphosis of the liver in a dog two months after complete pancreatectomy.

hitherto undescribed internal secretion, manufactured by the pancreas and effective on oral administration. The name lipocaic was suggested for this substance as having to do in a general way with the utilization of fat.

During the three years since our initial report, a considerable amount of work has been carried on in this laboratory with the aid of a number of associates, the result of which has been to confirm and extend the original conclusions. It may therefore be helpful to summarize the evidence at present available which indicates that lipocaic is a specific pancreatic hormone.

The depancreatized animal clearly suffers from two known deficiencies, insulin and pancreatic juice. The fact that the adequate administration of insulin does not permit these animals to survive for long suggests that pancreatic juice may also be essential. Experimental studies [7] have, however, demonstrated that the oral administration of fresh active pancreatic juice, together with insulin therapy, does not prolong life or prevent the characteristic fatty changes in the liver, although the digestion and absorption of food are much improved. This finding indicates that the beneficial result obtained by feeding raw pancreas cannot be accounted for on the basis of its content of pancreatic enzymes. The evidence, which indicates that the choline or lecithin in pancreas also cannot account for its effect, may be stated as follows:

1. It requires approximately 2 Gm. of choline a day over and above that present in the diet to exert this beneficial effect, whereas 100 Gm. of pancreas, which is an effective dose, contains only about 250 mg. of choline.[8]

2. The effect of the feeding of pancreas is specific. Liver and brain, which contain as much or more lecithin and choline, exert no beneficial effect.[7]

3. When extracts of pancreas are made, the active substance appears in the fat-free alcohol extract, whereas the ether soluble fractions, which contain practically all the lecithin of the pancreas and accordingly almost all the choline, are inert.[7]

4. It has been possible to secure an extract from pancreas which exerts the typical effect of the gland in a daily dose of from 60 to 100 mg. of dried substance. This material is free of fat and contains not more than from 1 to 2 per cent of free choline. It is effective both on oral and on subcutaneous administration. The details of the preparation of this extract have been reported elsewhere.[9]

The evidence outlined seems sufficient to warrant the conclusion that the active substance in pancreas is other than choline and that it is specific and probably effective in small amount. It is likely that our most potent extracts are still crude and contain much inert material. Since this substance corrects a specific defect in the animal whose pancreas has been removed, and since it is not present in the external secretion of the gland, the conclusion seems reasonable that it represents a specific internal secretion or hormone distinct from insulin.

The function of this hormone is still, however, but little understood. What little is known may perhaps best be brought into view by recounting the sequence of events which follow when the pancreas in the dog is completely removed. An immediate hyperglycemia and glycosuria develop, the animal becomes rapidly emaciated and death occurs from so-called pancreatic diabetes in from one to four weeks. A marked accumulation of fat in the liver occurs during the first two or three days after the operation. This is particularly striking in fat dogs, and such animals usually display a marked lipemia and acidosis. These abnormalities are probably to be attributed to the lack of insulin. If the depancreatized dog is placed on a standard mixed diet of protein, carbohydrate and fat, given active pancreatic juice by mouth and sufficient insulin (usually from 15 to 20 units) to limit the excretion of urinary sugar to 10 Gm. a day, life is considerably prolonged and the defect due to the absence of lipocaic made manifest. The early accumulation of fat in the liver disappears,

5. Best, C. H., and Huntsman, M. E.: J. Physiol. **75**: 405 (Aug.) 1932.

6. Best, C. H.; Ferguson, G. C., and Hershey, J. M.: J. Physiol. **79**: 94 (July 28) 1933.

7. Dragstedt, L. R.; Van Prohaska, John, and Harms, H. P.: Am. J. Physiol. **117**: 175 (Sept.) 1936. Van Prohaska, John; Dragstedt, L. R., and Harms, H. P., ibid. **117**: 166 (Sept.) 1936.

8. Fletcher, J. P.; Best, C. H., and Solandt, O. M.: Biochem. J. **29**: 2278 (Oct.) 1935.

9. Clark, D. E.; Vermeulen, C. W.; Donovan, P. B., and Dragstedt, L. R.: Proc. Am. Physiol. Soc., April 1939, p. 48.

acidosis is relieved and the blood fats return to about the normal concentration. However, as time goes on, there occurs a steadily lessening excretion of dextrose, in spite of continually decreasing doses of insulin, until after from six to eight weeks the animal may excrete only a gram or two of dextrose a day and receive

Fig. 2.—Biopsy specimen showing disappearance of fat and return of normal structure after the oral administration of lipocaic for twenty-six days.

only from 2 to 3 units of insulin. Larger amounts of insulin, even 5 units, may at this time provoke fatal hypoglycemic convulsions. This marked insulin sensitivity is a characteristic sign of the fatty liver of lipocaic deficiency. Impairment of liver function is revealed by the bromsulphalein test.[10] The concentration of blood lipids is reduced to about one half the normal value. Progressive weakness and loss of appetite develop, the animal becomes emaciated, treatment with insulin becomes more and more difficult and death occurs. At autopsy the liver is found to be enlarged to three or four times its normal size and so infiltrated with fat that the normal architecture is entirely obscured (fig. 1). Of 154 depancreatized dogs whose course was carefully studied in our laboratory, these fatty changes failed to develop in only thirteen. Both regular and protamine zinc insulin have been used in this work, but no significant differences have been observed.

If lipocaic is given to such a depancreatized animal at the time when the excretion of sugar has become minimal and the insulin requirement reduced to less than 5 units a day, a striking change is produced. An immediate and large excretion of dextrose in the urine occurs and the insulin dosage may be raised to 20 or 25 units a day without harm. The blood lipids promptly rise to the normal level or even higher, and liver function tests reveal improvement in bromsulphalein excretion. Biopsies of the liver during this period disclose a rapid disappearance of the fat and a return of the normal structure (figs. 1 and 2).

The large dextrose excretion and increased tolerance to insulin suggest that under the influence of lipocaic the fat in the liver is being converted into dextrose. The possibility of such conversion in the organism has long been recognized for the glycerin part of the fat molecule but denied for the fatty acid. The large amounts of dextrose made available in these experiments, however, seem to demand such a conversion for the fatty acid.

The clinical application of these studies on the lower animal may prove to be of great interest. Enlargement of the liver due to extensive fatty infiltration is not uncommon in human diabetes mellitus, particularly in children. Joslin and his associates in this country have repeatedly called attention to this complication. In this connection it is important to recognize, as already noted, that two entirely distinct forms of fatty liver are seen in depancreatized dogs, one developing immediately after operation in well nourished animals that receive insufficient amounts of insulin and a second more serious variety, which appears later in spite of adequate insulin therapy and is due to lipocaic deficiency. The former type is characterized by the presence of hyperlipemia and acidosis, normal liver function and tolerance to relatively large doses of insulin. In these cases better control of the diabetes by more adequate administration of insulin relieves the abnormalities. The second variety is characterized by hypolipemia, impaired liver function, diminished excretion of dextrose and marked sensitivity to even small doses of insulin. The administration of insulin has no effect on the fat in the liver and may produce fatal hypoglycemia. This type is specifically relieved by lipocaic. There already is evidence that these two types of fatty metamorphosis of the liver are seen

Fig. 3.—Specimen showing arteriosclerosis of the aorta in a dog nine months after complete pancreatectomy. Note the thickening of the intima, the disruption of the media, and the deposition of amorphous lipoid and calcareous material in the media and in the subendothelial layers.

in human diabetes, the former illustrated in the reports of Marble, White, Bogan and Smith[11] and the latter in the paper of Grayzel and Radwin.[12] The latter authors treated three young diabetic patients who had hepatomegaly by means of lipocaic and secured a strik-

10. Goodpasture, W. C.; Vermeulen, C. W.; Donovan, P. B., and Dragstedt, L. R.: Am. J. Physiol. **124**: 642 (Dec.) 1938.

11. Marble, Alexander; White, Priscilla; Bogan, Isabel, and Smith, Rachel: Enlargement of the Liver in Diabetic Children, Arch. Int. Med. **62**: 740 (Nov.) 1938.

12. Grayzel, H. C., and Radwin, L. S.: Hepatomegaly in Juvenile Diabetes Mellitus Treated with Pancreatic Extract, Am. J. Dis. Child. **56**: 22 (July) 1938.

ing recession of the liver to its normal size. The hepatomegaly returned when the lipocaic was discontinued and again receded when lipocaic was resumed. The diabetes in these cases had been well controlled by diet and insulin. Rosenberg [13] reported a case of hepatomegaly and impaired liver function in an adult who had mild diabetes which did not improve with better control of the diabetes with diet and insulin. A biopsy of the liver secured at operation revealed fatty metamorphosis similar to that seen in the depancreatized dog. The administration of lipocaic brought about improvement in liver function, recession in the size of the liver and disappearance of fat, as revealed by a second biopsy.

There is considerable evidence at present that the patient with diabetes mellitus is not returned to an entirely normal state by the administration of insulin. In particular he seems to suffer from a lessened capacity to utilize fats, and many students of this disease have advocated a low fat, high carbohydrate diet with insulin in treatment. In this connection it may be significant that symptoms of lipocaic deficiency in depancreatized dogs may be mild or entirely absent on low fat diets, only to become manifest when liberal amounts of fat are fed. It seems definitely established that the diabetic patient, whether adequately treated or not, is much more liable to the development of presenile atheromatosis and arteriosclerosis than is the normal individual. In his characteristically striking way Joslin states that the diabetic patient who in the preinsulin era used to die from acidosis now dies from coronary disease or diabetic gangrene. Does this mean that many diabetic patients suffer not only from an insulin deficiency but also from a deficiency of lipocaic, which manifests itself in a disturbance in fat utilization, with deposition of fat in the liver and in the more chronic cases in the subendothelial layers of the arteries? In partial answer to this query, I may state that we have recently reported the development of typical atheromatosis and arteriosclerosis in six depancreatized dogs maintained in our laboratory from six to nine months [14] (fig. 3). In these animals the diabetes was well controlled with insulin but the fatty livers of lipocaic deficiency were repeatedly permitted to develop in the course of our assay studies. Since spontaneous arteriosclerosis of this degree in the domestic dog is exceedingly rare, the observations here seem significant. The belief of some students [15] of the disease that the incidence of presenile arteriosclerosis in cases of diabetes is especially high when diets rich in fat are fed is also in harmony with this view.

## CONCLUSIONS

1. The demonstration that lipocaic is an internal secretion of the pancreas depends on the recognition that the depancreatized dog, fed on a mixed diet of protein, carbohydrate and fat, is not restored to a normal state by the adequate administration of insulin and pancreatic juice and that the remaining deficiency is corrected by the oral administration of the pancreas but not by other organs.

2. Extracts of pancreas have been prepared which are effective on oral and subcutaneous administration in daily doses of from 60 to 100 mg. of dried substance. Since these extracts are practically free from lecithin and choline, the former conclusion that the beneficial effect of pancreas feeding in depancreatized dogs cannot be accounted for on the basis of its content of these chemicals is confirmed.

3. Two types of fatty infiltration of the liver occur in both diabetes mellitus and pancreatic diabetes. One type is due to poor control of the diabetes by inadequate administration of insulin and is characterized by a normal or high concentration of the blood lipids and acidosis and is relieved by better insulin therapy. The second type is due to lipocaic deficiency and is characterized by a low concentration of the blood lipids, impaired liver function, decreased dextrose excretion and insulin sensitivity and is relieved by lipocaic therapy but not by insulin.

4. The occurrence of arteriosclerosis in depancreatized dogs is of greater incidence than normal for this species. There is a possible relation of lipocaic to this complication in both pancreatic diabetes and diabetes mellitus.

950 East Fifty-Ninth Street.

13. Rosenberg, D. H.: Am. J. Digest. Dis. 5: 607 (Nov.) 1938.
14. Dragstedt, L. R.; Goodpasture, W. C.; Vermeulen, C. W., and Clark, D. E.: Proc. Am. Physiol Soc., April 26, 1939, p. 63.
15. Joslin, E. P.: The Treatment of Diabetes Melltius, Philadelphia, Lea & Febiger, 1935, p. 328.

## ABSTRACT OF DISCUSSION

DR. DAVID H. ROSENBERG, Chicago: I wish to present some therapeutic effects observed in a case of marked fatty metamorphosis of the liver associated with diabetes mellitus. The patient's liver was 10 cm. below the costal margin on inspiration. An intravenous dextrose tolerance test was abnormal. The hippuric acid test revealed an excretion of 49 per cent in four hours. The bromsulphalein test showed 20 per cent retention at the end of thirty minutes. Laparotomy was done for the removal of an enlarged right ovary, at which time the liver was found enlarged, grossly fatty and yellowish. A section was removed for biopsy. The patient was observed for a control period of 138 days, during which time no subjective or objective improvements were observed. At the end of this period, the dextrose tolerance test was still abnormal and the bromsulphalein retention remained unaltered. Lipocaic therapy was then instituted, the patient receiving 5 Gm. a day by mouth. In six weeks a progressive diminution in the size of the liver was first noted, and in eleven weeks the edge of the liver was 1.5 cm. below the costal margin on inspiration. The consistency appeared normal, and tenderness had completely disappeared. The hippuric acid test returned to normal, as did the bromsulphalein retention. At this time the patient had a series of recurrent attacks of biliary colic accompanied by the development of hydrops of the gallbladder, for which she was readmitted to the hospital. At operation the liver was normal in size, color and consistency. A biopsy was again taken. The dextrose tolerance test during the postoperative period showed a normal response. The blood cholesterol, which before and during the control period was normal, had risen to 348 mg. per hundred cubic centimeters. During the postoperative period, at which time lipocaic therapy was temporarily discontinued, the cholesterol level began to drop, and when lipocaic was again exhibited it rose to its former level. Histologic examination of the first section revealed marked fatty infiltration and degeneration of the liver, characterized by swelling of the liver cells, filling of the cytoplasm with larger and smaller droplets of fat and displacement of the nuclei to the periphery, presenting thereby a signet ring appearance. The remaining liver cords, which were more intact, showed coarse granulation and swelling. Under higher magnification these changes were even more clearly evident. After lipocaic therapy, a striking change in the architectural appearance was readily seen. A marked disappearance of the fat globules was apparent, although the remaining cells still showed some granular degeneration and some swelling. This was more clearly evident from the higher magnification. During the period of lipocaic therapy, subjective improvement in the symptoms was also noted. I have observed, therefore, the clinical counterpart of the experimental observations recorded by Dr. Dragstedt.

# *Clinical Notes, Suggestions and New Instruments*

## NECROSIS OF THE ANTERIOR PITUITARY FOLLOWING PARTURITION

H. C. GOTSHALK, M.D., AND I. L. TILDEN, M.D., HONOLULU, HAWAII

Sheehan[1] in 1937 reported twelve cases of necrosis of the anterior lobe of the pituitary occurring in a consecutive fatal series of seventy-six women, seventeen of whom died in late pregnancy or at delivery and fifty-nine during the puerperium. He was able to collect from the literature thirty-six additional cases of pituitary necrosis following delivery. Of these forty-eight cases, twenty-seven were recent and twenty-one healed lesions of the pituitary.

Sheehan, from a study of these cases, states that necrosis of the anterior pituitary is a relatively frequent finding in women dying during the puerperium. According to this author, the necrosis begins about the time of delivery and is due to thrombosis of the pituitary vessels. This often follows symptoms of collapse when the latter is due to hemorrhage.

If the patient survives this pituitary necrosis in the puerperium she often develops symptoms of pituitary insufficiency ranging from Simmond's disease to milder forms of pituitary dysfunction. Sheehan and Murdoch,[2] in a follow-up of 128 patients who had had various degrees of hemorrhage at delivery some years previously, found symptoms suggesting pituitary insufficiency dating from delivery in forty-one. It was concluded that the symptoms in these cases were due to healed postpartum necroses of the anterior lobe of the pituitary.

The present case falls clearly into the group with recent necrosis of the pituitary gland and presents several features of interest not previously described. It is accordingly thought to be worthy of presentation.

### REPORT OF CASE[3]

*History.*—Mrs. C. A., aged 26, Caucasian-Hawaiian, primipara, secundigravida, entered the Queen's Hospital Feb. 8, 1939, at 1 a. m. in active labor. Her pains started three hours prior to admission. One previous pregnancy in 1937 terminated in a spontaneous abortion at the sixth month. Her past history was otherwise irrelevant.

Examination at the time of admission revealed a well developed, somewhat obese, young woman in active labor. The heart was normal. The blood pressure taken while she was resting quietly was 160 systolic, 118 diastolic. Urine examination was negative and the Wassermann and Kahn reactions were negative. The pelvic measurements were normal, vertex presenting, right occipito-anterior position. The cervix was 2 cm. dilated.

The uterine contractions were good but the cervix was slow in dilating. The membranes were ruptured at 11:30 p. m. of the day of admission and the cervix was completely dilated one hour later, the total duration of the first stage of labor being twenty-six and one-half hours. At 1:20 a. m., February 9, a normal 7 pound 13 ounce (3,544 Gm.) boy was delivered spontaneously, the patient sustaining a second degree perineal laceration, which was repaired at once. The placenta and membranes were expressed intact six minutes later. A 1 cc. ampule of solution of posterior pituitary (1 cc.) and 1 cc. of a proprietary uterine stimulant were given following delivery of the placenta but for five minutes the uterus failed to contract and considerable hemorrhage occurred. The fundus finally contracted following massage and the administration of a second ampule of solution of posterior pituitary and the proprietary, and the patient was put to bed at 1:45 a. m. with the pulse 88 and the blood pressure 110/84. The estimated loss of blood during delivery was from 600 to 800 cc. and the total duration of labor was twenty-seven and one-half hours.

Four and one-half hours later the patient had saturated several pads and her pulse had risen to 124. The blood pressure had dropped to 92/55. Her uterus was atonic to palpation and an additional ampule of solution of posterior pituitary was given immediately. Examination showed a three-fourths inch cervical tear but the hemorrhage appeared to be coming from the uterus. The blood pressure dropped still further to 70/30. The patient became dyspneic and restless and the pulse became imperceptible. Ephedrine and carbon dioxide and oxygen were administered and intravenous dextrose (10 per cent in Hartman's solution) was started. A transfusion of 500 cc. of citrated blood was given at 9:25 a. m. A second transfusion of 575 cc. of citrated blood was given an hour later, following which the patient's pulse filled out and slowed down to 114. She appeared to be in good condition and stated that she "felt like a million dollars." Prior to the first transfusion the patient had a hemoglobin of 65 per cent and a red cell count of 3,900,000. Nevertheless, because of the symptoms, it was thought that she was suffering from acute loss of blood. Three hours later she lost an additional estimated 500 cc. of blood and a third transfusion, 250 cc., was given.

During the afternoon she again went into a condition of shock with rapid pulse and increasing dyspnea. A second blood count showed 4,230,000 red cells with 75 per cent hemoglobin. Although there had been no further loss of blood, a fourth transfusion of 300 cc. of citrated blood was given that evening.

Fig. 1.—Section under low power showing (1) the small zone of normal tissue and (2) the necrotic area involving the greater part of the anterior lobe.

Her blood pressure remained low, 80/55. She dozed at intervals during the night but was restless in her sleep and her pulse remained weak, rapid and irregular. Her abdomen became somewhat distended. The red cell count early the next morning was 4,230,000, with 75 per cent hemoglobin.

At 3 p. m. that afternoon (February 10) she became irrational and the pulse imperceptible. Cyanosis developed and her abdomen became more distended. That evening generalized clonic spasms set in with twitching of the left arm and the muscles of the forehead. Her temperature rose from 101 to 103 F. and she ceased breathing at 7:25 p. m., ninety-four hours following the onset of labor pains and sixty-seven hours after delivery.

*Postmortem Examination.*—An autopsy was done immediately after death, before the onset of rigor mortis. The pupils were dilated and equal. The breasts were large and the abdomen was distended. The abdominal fat measured 3 cm. in thickness.

Both pleural cavities were free of fluid and no adhesions were present about either lung. Both lower pulmonary lobes were partially collapsed but no obstruction could be demonstrated in the trachea or main bronchi. The lungs on sectioning presented a dry surface with marginal atelectasis of the lower lobes.

The pulmonary artery and its main branches were free of emboli. The pericardial sac contained an average amount of clear fluid. The heart was average in size, the wall of the

From the Department of Pathology, the Queen's Hospital.

1. Sheehan, H. L.: Postpartum Necrosis of the Anterior Pituitary, J. Path. & Bact. **45**: 189-214 (July) 1937.

2. De Lee, Joseph B., and Greenhill, J. P.: Year Book of Obstetrics and Gynecology, Chicago, Year Book Publishers, 1938.

3. This case is reported by the courtesy of Dr. A. E. Duryea.

left ventricle measuring 1.5 cm. in thickness. The muscle was firm and reddish brown. The valves were all normal in appearance and the coronaries were open.

No free fluid was found in the peritoneal cavity. The liver was on a level with the right costal margin. Both diaphragms were pushed upward by the distended bowel, the right to the level of the third interspace and the left to the fourth rib. The fundus of the uterus was on a level with the umbilicus.

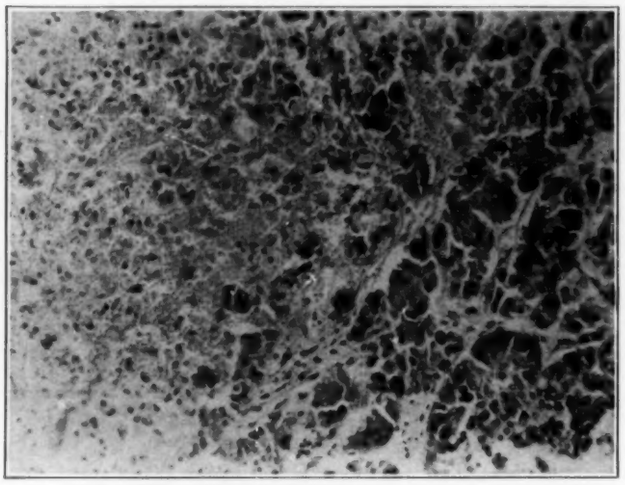

Fig. 2.—Section under medium power showing the junction between the zone of normal and necrotic tissue.

The liver and kidneys were average in size and showed no recognizable gross pathologic change other than cloudy swelling. The pancreas, spleen and adrenals were normal in appearance.

The stomach and bowel were distended by gas and contained a moderate amount of semiliquid, yellow green material. The mucous membrane was pale and no ulceration or other lesion could be found.

The wall of the uterus measured 3.5 cm. in thickness. The endometrium was ragged and hemorrhagic but there was no gross evidence of infection. No retained placental tissue could be found. Two small lateral cervical tears were present, each measuring 1.5 cm. in length. The uterine and ovarian veins were thin walled and normal in appearance. The iliac veins showed no evidence of thrombophlebitis. Both tubes and ovaries were average in size and showed no gross abnormality. In general, the appearance was that of a normal postpartum uterus.

The brain, on sectioning, presented no gross evidence of hemorrhage or softening. The ventricles were of normal size and contained an average amount of clear spinal fluid.

Examination of the pituitary revealed a spherical nodule slightly less than 1 cm. in diameter, bulging through the diaphragma sellae and impinging on the infundibulum. There was no apparent pressure on the optic chiasm. The gland was carefully dissected free and when removed weighed 1.5 Gm. It was soft to the touch and appeared swollen and edematous. After fixation in 10 per cent solution of formaldehyde a lateral section was made through the anterior lobe and the attached, overlying nodule (fig. 1). This disclosed two zones, a small superficial dark zone at the periphery of the nodule and a large pale zone involving the remainder of the gland. The sella turcica was average in size.

Microscopic study of sections taken through the heart muscle, liver and kidneys revealed no pathologic change except moderate parenchymatous degeneration. No abnormality was found in the lungs, spleen, pancreas or adrenals. No signs of inflammation could be found in the wall of the uterus.

Examination of sections taken through the anterior lobe of the pituitary revealed an interesting and striking picture. The superficial dark zone was made up of normal appearing glandular tissue in which both chromophobe and chromophil cells could easily be distinguished. This was limited to the peripheral portion of the nodule, which was bulging through the sella. The remainder of the anterior lobe showed early but unmistakable and widespread necrosis. The transition between the two zones was rather sharp (fig. 2). In most areas the cell outlines were preserved but the cells were swollen and granular, often broken up with disappearance of the nuclei. In several regions there was complete loss of structure with replacement by débris. Red blood cells, many of them broken down, were scattered everywhere and widespread deposition of hemosiderin was present both within and without the skeleton remains of the glandular alveoli. Polymorphonuclear cell infiltration formed a prominent part of the picture (fig. 3). These cells were most numerous in the more badly necrosed areas but were also found in generous numbers in all parts of the gland. Although numerous sections were carefully examined, no thrombosis of the vessels could be found. A number of the endothelial spaces were collapsed; most of them contained broken down red cells. The picture, in brief, was one of early necrosis of the greater part of the anterior lobe of the pituitary.

## COMMENT

In studying the facts of this case, a number of points seem important:

1. During delivery a moderate amount of blood was lost (from 500 to 800 cc.). Four hours later the patient had a severe hemorrhage with atonia of the uterus and collapse, for which 1,625 cc. of citrated blood was given in four transfusions.

2. Her red cell count taken just before death was 4,300,000, with 75 per cent hemoglobin.

3. The patient's blood pressure while resting was 160/118. Immediately following delivery it fell to 110/84 and for a long time remained as low as 70/30.

4. The only significant finding at autopsy was marked hyperplasia of the anterior pituitary with widespread necrosis of the greater portion of this structure and no evidence of thrombosis. The gland weighed 1.5 Gm.

The pituitary gland has a very rich blood supply, which is brought in by numerous small branches of the circle of Willis.[4] These run in the pia mater of the infundibulum and thus gain access to the gland. Here they break up into small sinuses, which are devoid of muscle fibers and lined only by endothelial cells. The outgoing blood drains into the circular sinus. This vascular structure facilitates the exchange of fluids and secretory products of the cells.

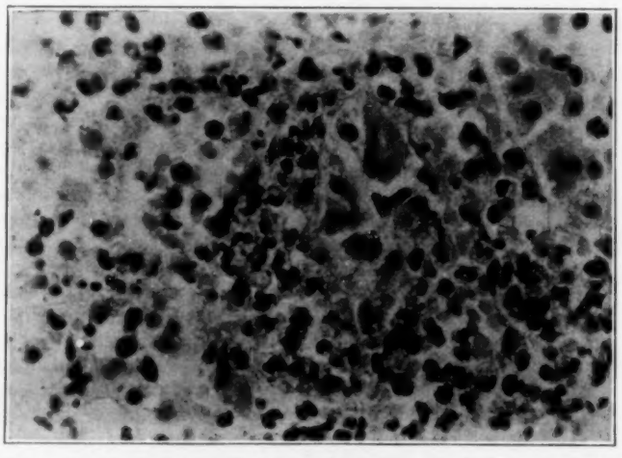

Fig. 3.—Section under high power showing polymorphonuclear cell infiltration.

It is well established that there is marked enlargement of the pituitary gland during pregnancy, which reaches its maximum at the time of delivery.[5] There is a corresponding increase in the vascularity of the gland.

An excessively enlarged pituitary gland confined within a rigid space, such as the sella turcica, would exert a definite pressure on this structure and probably suffer some degree

4. Maximow, Alexander A., and Bloom, William: A Text-Book of Histology, Philadelphia, W. B. Saunders Company, 1930.

5. Curtis, Arthur Hale: Textbook of Gynecology, ed. 2, Philadelphia, W. B. Saunders Company, 1936. Mazer, Charles, and Goldstein, Leopold: Clinical Endocrinology of the Female, Philadelphia, W. B. Saunders Company, 1932. Wolf, William: Endocrinology in Modern Practice, Philadelphia, W. B. Saunders Company, 1937.

of vascular compression. If the blood pressure should suddenly fall, collapse of the endothelial spaces might take place with resulting ischemic necrosis of the gland.

In this case, we suggest that the pituitary necrosis started immediately after delivery with the fall in blood pressure. The atonia of the uterus and the severe hemorrhage which occurred four hours later may well have been due to the pituitary damage.

It follows that in all cases of this kind every effort should be made to maintain the blood pressure at a normal level. It has been shown that this condition is more common than is generally realized and must account for a certain number of postpartum deaths as well as for some of the late complications of pregnancy.

## *Special Articles*

# TRICHINOSIS AND NONCLINICAL INFECTIONS WITH TRICHINELLA SPIRALIS

PREPARED BY A SPECIAL COMMITTEE APPOINTED BY R. C. POLLOCK, CHICAGO, CHAIRMAN, ADVISORY COUNCIL ON LIVE STOCK AND MEAT RESEARCH

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CHICAGO

Trichinella spiralis is a microscopic parasite that may be found as an encysted larva in man and many animals, including the dog, rat, hog, cat and bear. Recent surveys have shown that the number of persons in whom trichinella larvae may be found is considerably larger than was previously suspected. There is no evidence that the presence of the parasites was accompanied, so far as known, by clinical symptoms of trichinosis.

The recent discovery of nonclinical infections with trichinella necessitates a review of the significance of the newer investigations and a consideration of present safeguards against trichinosis.

The disease trichinosis is acquired by man primarily from eating trichinous pork which has not been thoroughly cooked.[1] At the present time there is no known practical method of inspection whereby the muscle tissue of pork can be adequately examined for the presence of trichinella larvae.

The meat inspection authorities of the United States government and those interested in the distribution of meat have made vigorous efforts to establish the fact in the public mind that all pork should be cooked thoroughly.

Certain products containing pork muscle tissue are rendered safe for consumption without subsequent cooking by the consumer by rigid treatment prescribed by federal meat inspection. This treatment is based on exhaustive scientific research and involves refrigeration, heating or curing. Among the products so treated under federal inspection are ready to eat hams, Italian style hams, capicoli and Canadian style bacon.

The Bureau of Animal Industry[2] of the United States Department of Agriculture[3] designates that "no article of a kind prepared customarily to be eaten without cooking shall contain any muscle tissue of pork unless the pork has been subjected to a temperature sufficient to destroy all live trichinae or to other treatment prescribed by the Chief of Bureau." These pork products can be safely consumed without cooking by the consumer provided they were processed in a packing plant operating under federal supervision or in plants where methods of processing equivalent to those approved by the United States Bureau of Animal Industry are enforced. The inspection of meat by the United States Bureau of Animal Industry is carried out only in packing plants where meat is designed for "transportation or sale as articles of interstate or foreign commerce." It is required that such establishments be operated under federal inspection and that the inspection apply to all meat and meat food products. Such meats and meat products are identified by the legend "U. S. Inspected and Passed."

It should be stressed at this point that the legend "U. S. Inspected and Passed" on fresh pork or on ordinary varieties of cured pork which the consumer customarily cooks does not mean that the product so marked is necessarily free from Trichinella spiralis.

Actually, enough is known concerning Trichinella spiralis to enable one familiar with the facts to avoid infection by exercising reasonable caution. Schwartz[4] stated that "in the final analysis, the prevention of trichinosis is a personal responsibility and involves the thorough cooking of all pork. Pork products of kinds customarily eaten without cooking are also dangerous unless it is definitely known that such products were prepared in a plant operating under federal meat inspection or equally thorough state or local supervision." This suggestion may well serve as part of a program designed to eradicate trichinella infections and the disease trichinosis. However, if a program of this type is to be effective, every consumer of pork and every plant operator must realize his or her responsibility. Conducive to a realization of this responsibility is a distribution of factual data concerning Trichinella spiralis.

## LIFE HISTORY OF TRICHINELLA SPIRALIS AND SOURCE OF HUMAN INFECTIONS

The presence of Trichinella spiralis in susceptible animals occurs as a result of eating uncooked or untreated striated muscle of an animal infected with trichinella larvae. The encapsulated larvae, liberated in the stomach of the host by the action of the digestive juices, pass on to the intestine. In the small intestine they reach sexual maturity in about two days, after which mating occurs. These adult parasites range from 1.6 to 4 mm. in length and from 0.04 to 0.06 mm. in breadth. The females actively penetrate the mucosa of the intestine and eventually deposit their larvae in the lymph spaces of the villi. They may continue giving birth to larvae for several weeks. The larvae are car-

These authors were appointed as a special committee by Mr. R. C. Pollock.

Many physicians and co-workers have offered constructive suggestions in the preparation of this manuscript, especially Dr. Morris Fishbein, of the American Medical Association; Dr. Benjamin Schwartz, of the Bureau of Animal Industry, United States Department of Agriculture; Dr. Irving S. Cutter, of Northwestern University Medical School; Dr. James B. McNaught, of Stanford University School of Medicine, and Dr. Carl W. Apfelbach, of Rush Medical College.

1. It has been established that a minimum temperature of 137 F. in every part of the cut being cooked will destroy all trichinella larvae. Fresh pork which is pink has not reached a sufficiently high temperature and should not be eaten without further cooking.

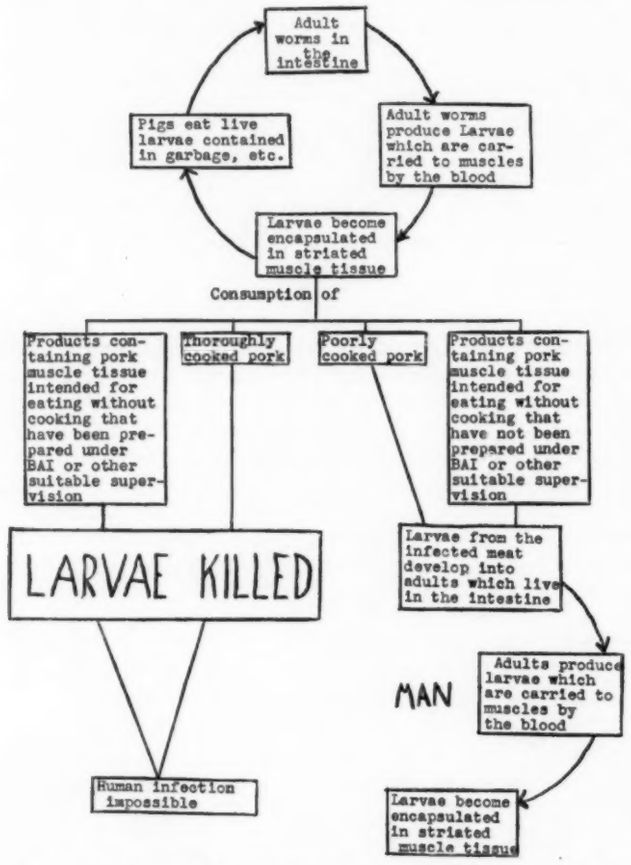
2. The Federal Meat Inspection Service is administered by the Bureau of Animal Industry of the United States Department of Agriculture.

3. Regulations Governing the Meat Inspection of the United States Department of Agriculture, Bureau of Animal Industry order 211, revised. Regulations 18, sec. 7, par. 4, p. 44, 1922, Dept. Agri. Service & Regulatory Announcements, Bureau of Animal Industry, March 1937, pp. 27-31, Washington, D. C., Government Printing Office.

4. Schwartz, Benjamin: Trichinosis: A Disease Caused by Eating Raw Pork, leaflet 34, United States Dept. of Agriculture, 1929.

ried by the blood stream to the striated muscle fibers and attain their maximum size of 1 mm. in about two weeks. It is then that the larvae assume coiled positions and become encapsulated. Calcification about the capsules occurs slowly after a number of months. If not eaten by a susceptible host before they die and undergo degenerative changes, the larvae in the calcified cysts eventually die and are slowly absorbed or else become calcified.

A summary of the life cycle is shown in the diagram. The life cycle has a particular bearing on the presence of trichinella in human beings. It will be noted that the principal source of human infection is pork. Human infections from this source are made possible only by the consumption of (*a*) raw or undercooked pork, (*b*) improperly cured pork, so far as the destruction of trichinella larvae is concerned, or (*c*) products containing muscle tissue of pork intended for eating without cooking which have not been subjected to the treatment prescribed by or equivalent to that stipulated by the United States Bureau of Animal Industry as being necessary to kill living trichinella larvae.


Adult worms in the intestine
Adult worms produce Larvae which are carried to muscles by the blood
Larvae become encapsulated in striated muscle tissue
Pigs eat live larvae contained in garbage, etc.
Consumption of
Products containing pork muscle tissue intended for eating without cooking that have been prepared under BAI or other suitable supervision
Thoroughly cooked pork
Poorly cooked pork
Products containing pork muscle tissue intended for eating without cooking that have not been prepared under BAI or other suitable supervision
LARVAE KILLED
Larvae from the infected meat develop into adults which live in the intestine
MAN
Adults produce larvae which are carried to muscles by the blood
Human infection impossible
Larvae become encapsulated in striated muscle tissue

Life cycle of Trichinella spiralis, showing source of human infection and method of preventing infection.

### THE COURSE OF THE DISEASE TRICHINOSIS [5]

According to the classic accounts of trichinosis, there are three stages of the disease, each stage corresponding to the behavior of the parasite in the body. In some cases these stages are not well defined. The principal symptoms produced in each stage are briefly as follows:

1. Period of invasion of host, or that period wherein the organisms develop to maturity in the intestine. Gastrointestinal manifestations such as nausea, vomiting, diarrhea and abdominal pain occur during this stage.

2. Period of dissemination of larvae, or that period when the larvae are carried into the lymphatics and blood stream to be distributed to the striated muscles. There occur then fever, muscle tenderness, edema about the eyes and eosinophilia; these symptoms may become pronounced within from ten days to two weeks after infection.

3. Period of encystment, which is the convalescent period in mild involvement. In overwhelming infections, however, marked edema of the face, severe cachexia, delirium and coma may occur.

### DIAGNOSIS

The cardinal points in diagnosis are (1) history of eating raw pork or underdone or undertreated pork or pork products, (2) gastrointestinal disturbances, (3) eosinophilia, (4) edema, usually suborbital, (5) high fever, (6) myositis and (7) myalgia.

The principal diagnostic methods that may be used are (1) biopsy, (2) examinations of the stool, blood and cerebrospinal fluid for larvae, (3) the precipitin test, (4) the intradermal test and (5) differential white blood cell counts.

### DIAGNOSTIC DIFFICULTIES

Hall [6] and other writers before him have emphasized that the disease trichinosis is easily confused with many other pathologic conditions. From reports of individual cases and group outbreaks there is evidence that many physicians are well able to recognize the symptoms of trichinosis and make a diagnosis. Outbreaks have been recognized, and several of these outbreaks have stimulated an interest in the application of skin tests as aids in diagnosing the disease and in recognizing mild infections. For instance, an outbreak in a Vermont CCC camp recently reported by Ferenbaugh, Segal and Schulze [7] illustrates this. In sixty-four cases trichinosis was so diagnosed. Six days after the first patient was admitted the diagnosis was made At that time the white cell count in the first case had risen to 27,850 per cubic millimeter, 34 per cent of which were eosinophils. The presence of larvae in a sample of muscle removed from a person who was infected confirmed the diagnosis. In forty-three additional cases diagnosis was made during a period of two weeks and in twenty others there were positive reactions to skin tests.

The facts in connection with the outbreak under discussion show (1) that a correct diagnosis was made; (2) that no fatalities were reported, and (3) that progress is being made in methods of diagnosis, as evidenced by the use of the intracutaneous test.

### TREATMENT

There is no completely satisfactory treatment for trichinosis. If a person consuming uncooked trichinous pork consults a physician early enough, the administration of an anthelmintic may be effective in removing some of the adult organisms from the intestinal tract. However, after the larvae have gained entrance to the circulatory system or have infected the muscles, medical treatment can only alleviate the pain and discomfort. Preventive measures, therefore, must be employed in coping with trichinosis.

5. Hoyne, A. L., and Wolf, A. A.: Trichinosis: A Report of Trichinae in Vocal Cords of a Patient with Diphtheria, J. A. M. A. **111**: 701 (Aug. 20) 1938.

6. Hall, M. C.: Studies on Trichinosis: III. The Complex Clinical Picture of Trichinosis and the Diagnosis of the Disease, Pub. Health Rep. **52**: 539 (April 30) 1937.

7. Ferenbaugh, T. L.; Segal, Leo, and Schulze, H. A.: A Trichinosis Epidemic of Sixty-Four Cases, J. A. M. A. **110**: 1434 (April 30) 1938.

### INCIDENCE OF INFECTIONS

A number of surveys based on necropsies have been conducted in the United States in an attempt to determine the incidence of Trichinella spiralis in man. The results of these surveys are shown in the data briefly presented in table 1.

These data are not extensive enough to warrant an accurate estimate as to the general incidence of trichinella infections in the United States. Hall and Collins,[8] Nolan and Bozicevich[9] and Wright[10] have estimated from all available survey data that the incidence of human infections in the United States may be roughly described as between 17 and 18 per cent. This estimation of the incidence was made by the use of proper correction figures to provide comparable data for those cases in which only one method had been used in making the examinations.

Assuming that the figures for incidence of trichinella infections in persons dying in hospitals are valid for the living population, the estimates just cited tentatively indicate that between 17 and 18 per cent of the population in the United States at some time during their life acquire an infection with Trichinella spiralis. This does not mean that this percentage of the people in the United States have or have had the disease trichinosis. Pote[11] has pointed out that in the 1,060 autopsies done by him, 15 per cent of the subjects yielded trichinellae; he could find no evidence, however, that any of the persons involved had shown symptoms of trichinosis during life. Nolan and Bozicevich[9] pointed out that with rather complete clinical records for all of their 174 subjects with positive evidence, not one had a known clinical history of trichinosis. These authors likewise pointed out that this is true also for all of the 198 positive infections reported in the literature in connection with the survey studies of Whelpley,[12] Thornbury,[13] Queen,[14] Riley and Scheifley,[15] Hinman,[16] McNaught and Anderson[17] and Magath.[18]

In consideration of the data just presented, it at once becomes apparent that the presence of trichinella larvae does not necessarily mean that the host so infected exhibited clinical symptoms. These data indicate that about 18 per cent of the population harbor trichinella larvae. It would seem from these surveys that a rather large number of larvae must be consumed in improperly cooked or processed pork if noticeable adverse effects are to be exhibited by the host.

### INTENSITY OF INFECTIONS

From the incidence studies carried on thus far (table 1), it is not possible to correlate the intensity of infection with clinical manifestations. The authors of the surveys (table 1) in some cases were unable or made no attempt to secure lifetime clinical histories of the patients, and in cases in which rather complete clinical records were available there was no definite evidence that the patients ever had a lifetime history of clinical trichinosis. Estimates as to the number of larvae that must be present in order to produce clinical symptoms are highly speculative. In this connection, the results of studies by Nolan and Bozicevich[9] as presented in table 2 are particularly instructive.

TABLE 1.—*Incidence of Trichinella Infections*

| Author | Date | Place | Number of Examinations | Number of Positive Results | Percentage of Infection (Incidence) | Method of Study |
|---|---|---|---|---|---|---|
| Whelpley[12] | 1891 | St. Louis | 20 | 1 | 5.0 | Microscopic |
| Thornbury[13] | 1897 | Buffalo | 21 | 3 | 14.3 | Microscopic |
| Williams, H. U.: J. M. Research **6**: 64, 1901 | 1901 | Denver, Baltimore, Philadelphia and towns in New York | 505 | 27 | 5.4 | Microscopic |
| Queen[14] | 1931 | Rochester, N. Y. | 344 | 59 | 17.2 | Digestion |
| Queen[14] | 1931 | Boston | 58 | 16 | 27.6 | Digestion |
| Riley and Scheifley[15] | 1934 | Minneapolis | 117 | 20 | 17.1 | Microscopic |
| Hinman[16] | 1936 | New Orleans | 200 | 7 | 3.5 | Digestion |
| McNaught and Anderson[17] | 1936 | San Francisco | 200 | 48 | 24.0 | Digestion |
| Magath[18] | 1937 | Mayo Clinic | 220 | 17 | 7.7 | Microscopic |
| Pote[11] | 1937 | St. Louis | 1,060 | 163 | 15.4 | Microscopic |
| Sawitz, W.: Am. J. Pub. Health **27**: 1023, 1937 | 1937 | New Orleans | 200 | 10 | 5.0 | Digestion and microscopic |
| Walker, J. H., and Breckenridge, C. G.: J. Parasitol. **24**: 10 (Dec. supp.) 1938 | 1938 | Alabama | 100 | 33 | 33.0 | Digestion and microscopic |
| Evans, C. H., Jr.: J. Infect. Dis. **63**: 337, 1938 | 1938 | Cleveland | 100 | 36 | 36.0 | Microscopic and digestion |
| Nolan and Bozicevich[9] | 1938 | Widely spread area | 1,000 | 174 | 17.4 | Microscopic and digestion |
| Wright[10] | 1939 | Widely spread area | 2,000 | 341 | 17.1 | Microscopic and digestion |
| Hood, M., and Olson, S. W.: Am. J. Hyg. **29**: 51, Sect. D, 1939 | 1939 | Chicago | 428 | 68 | 15.9 | Microscopic and digestion |

From a study of table 2, it will be noted that of the 1,000 diaphragms examined, only three, or 0.3 per cent, had infections as high as 501 to 1,000 larvae per gram of diaphragm muscle and five, or 0.5 per cent, had infections of more than 100 larvae per gram. In these cases, in which rather complete clinical records were available, the medical history of the patients, so far as recorded, did not show a lifetime record of clinical trichinosis.

### CLINICAL CASES OF TRICHINOSIS IN THE UNITED STATES

Statistics are available which show the number of clinical cases of trichinosis reported in the United States

8. Hall, M. C., and Collins, B. J.: Studies on Trichinosis: I. The Incidence of Trichinosis as Indicated by Postmortem Examinations of 300 Diaphragms, Pub. Health Rep. **52**: 468 (April 16) 1937.

9. Nolan, M. O., and Bozicevich, John: Studies on Trichinosis: V. The Incidence of Trichinosis as Indicated by Postmortem Examinations of 1,000 Diaphragms, Pub. Health Rep. **53**: 652 (April 29) 1938.

10. Wright, W. H.: Studies on Trichinosis: XI. The Epidemiology of Trichinella Spiralis Infestation and Measures Indicated for the Control of Trichinosis, Am. J. Pub. Health **29**: 119 (Feb.) 1939.

11. Pote, T. B.: Present Incidence of Trichinella Spiralis in Man as Determined by a Study of 1,060 Unselected Autopsies in St. Louis Hospital, Am. J. M. Sc. **197**: 47 (Jan.) 1939.

12. Whelpley, H. M.: Trichina Spiralis, Am. Micros. J. **12**: 217, 1891.

13. Thornbury, F. J.: The Pathology of Trichinosis: Original Observations, Univ. M. Mag. **10**: 64, 1897.

14. Queen, F. B.: The Prevalence of Human Infection wth Trichinella Spiralis, J. Parasitol. **18**: 128 (March) 1931.

15. Riley, W. A., and Scheifley, C. H.: Trichinosis of Man a Common Infection, J. A. M. A. **102**: 1217 (April 14) 1934.

16. Hinman, E. H.: Trichinosis in Louisiana, New Orleans M. & S. J. **88**: 445 (Jan.) 1936.

17. McNaught, J. B., and Anderson, E. V.: The Incidence of Trichinosis in San Francisco, J. A. M. A. **107**: 1446 (Oct. 31) 1936.

18. Magath, T. B.: Encysted Trichinae: Their Incidence in a Private Practice and the Bearing of This on the Interpretation of Diagnostic Tests, J. A. M. A. **108**: 1964 (June 5) 1937.

between 1842 and 1936. Sawitz [19] reviewed the number of clinical cases of trichinosis as reported to the United States Public Health Service between the years of 1915 and 1936. He stated that there was a total of 2,968 clinical cases on record. This is merely an approximate figure, since trichinosis up to 1933 was a reportable disease in only thirty-two states. Sawitz supplemented the trichinosis reports of the United States Public Health Service with all cases of trichinosis reported in the medical journals from 1915 to 1936. He found that

TABLE 2.—*Number of Trichinella Larvae per Gram in the 174 Cases of Infection Found in One Thousand Examinations of the Diaphragm*

| Group | Number of Larvae per Gram | Number of Cases | Percentage of Cases |
|---|---|---|---|
| 1 | Less than 1 | 55 | 31.6 |
| 2 | 1-10 | 87 | 50.0 |
| 3 | 11-50 | 23 | 13.2 |
| 4 | 51-100 | 4 | 2.3 |
| 5 | 101-500 | 2 | 1.2 |
| 6 | 501-1,000 | 3 | 1.7 |
| 7 | Over 1,000 | 0 | 0.0 |
| Totals | | 174 | 100.0 |

1,584 clinical cases were reported. Ransom [20] estimated the number of clinical cases for the years 1842-1914 to be 1,575. Sawitz [19] stated (in 1938) that the total number of all reported clinical cases of trichinosis recorded in the United States since 1842 amounted to between 5,000 and 6,000. According to Sawitz, in the 1,584 clinical cases reported in the medical journals between 1915 and 1936, a period of twenty-one years, there was a 4.9 per cent recorded mortality, or seventy-eight deaths. That the recorded cases as just given are incomplete must be admitted, but precisely how many were missed is unknown.

According to this mortality figure, the average yearly death rate in the United States from trichinosis is somewhat less than 0.004 per hundred thousand population. This figure at most represents only a crude estimation of the death rate from trichinosis. However, if this figure were multiplied a hundredfold, the mortality rate would still be small when compared with death rates from other diseases. United States mortality statistics for the year 1936 [21] give the death rates per hundred thousand population for a few of the principal causes of death, as given in table 3.

So far as available data show, comparatively few deaths from trichinosis have been recorded in the United States. However, because of the known incidence of human trichinella infections, the disease trichinosis merits serious consideration, especially since nonfatal clinical trichinosis is a serious disease.

The distinction between a person harboring trichinella larvae and exhibiting no symptoms and a person having the disease trichinosis, which has been emphasized in this paper, is not without analogies familiar to every physician. The lungs of many healthy persons show healed tubercles. Again, it is common knowledge that the hemolytic streptococcus and other organisms which cause pneumonia may be present in the respiratory tracts of well persons. The differentiation between the disease and the occurrence of the causative organism is not set forth with the thought of minimizing the disease, but such a differentiation is essential to a clear grasp of trichinosis as a public health problem.

19. Sawitz, Willi: Prevalence of Trichinosis in the United States, Pub. Health Rep. **53**: 365 (March 11) 1938.
20. Ransom, B. H.: Trichinosis, Report of Eighteenth Annual Meeting of the United States Live Stock Sanitary Association, 1915, pp. 1-9.
21. Mortality Statistics, United States Department of Commerce, Bureau of the Census, 1936.

## PREVENTION

In considering ways of preventing trichinosis, it must be realized that, so far as man is concerned, raw and inadequately prepared pork constitutes the principal source of the disease. Consequently, if swine were free of larvae man would not ordinarily become infected. Data accumulated by the United States Bureau of Animal Industry on a total of over 8,000,000 hogs examined microscopically from 1898 to 1906 showed that 1.41 per cent contained live trichinella larvae. Realizing that these data, since only the microscopic method was used, may not be representative, the United States Bureau of Animal Industry in 1933 started a survey in which hogs were examined by means of the more efficient digestion method. Schwartz [22] has reported that on examination of the diaphragms of about 6,500 grain-fed hogs 0.91 per cent were found to be infected with trichinella, whereas in an approximately equal number of hogs fed garbage as collected the incidence was 4.41 per cent. It is generally accepted that swine become infected primarily by eating pork scraps containing live trichinella larvae. It becomes apparent that an effective method of preventing trichinosis in man is to eliminate the source of infection for hogs.

This can be done by not feeding hogs on garbage as collected, by cooking garbage intended as a hog feed or by keeping raw pork scraps out of garbage fed to hogs. The latter might be done by sorting garbage and removing raw pork scraps, but this is a difficult procedure in most cases.

It is imperative that all animal tissue known to carry the organism be kept from hogs, if the life cycle of the parasite is to be broken.

A second preventive measure involves the thorough cooking of all pork and pork products not processed in the manner prescribed by the United States Bureau of Animal Industry. The importance of cooking pork thoroughly should be realized by every one concerned with the preparation of meals.

In this connection, it is important to remember that cooking is always a health safeguard. Milk is pasteurized to destroy harmful bacteria, and other foods are

TABLE 3.—*Mortality Statistics for the Year 1936*

| | Deaths per 100,000 Population |
|---|---|
| Cancer and other tumors | 116.1 |
| Rheumatic diseases | 35.3 |
| Infectious and parasitic diseases | 115.9 |
| Diseases of blood and blood-making organs | 6.1 |
| Diseases of nervous system | 111.8 |
| Diseases of circulatory system | 289.4 |
| Diseases of respiratory system | 105.1 |
| Tuberculosis (all forms) | 55.7 |
| Diseases of digestive system | 72.9 |
| Diseases of genito-urinary system | 98.8 |
| Violent accidental deaths | 108.1 |

heated or cooked for the same reason. The proper application of heat in cooking is a valuable prophylactic measure.

A third preventive measure concerns products containing pork muscle tissue customarily intended to be eaten without consumer cooking As for meat food products which have been processed in a manner prescribed by the United States Bureau of Animal Industry, such products are safe for consumption without subsequent cooking, provided the consumer has first hand knowledge that the products were actually

22. Schwartz, Benjamin: Trichinosis in Swine and Its Relationship to Public Health, J. Am. Vet. M. A. **92**: 317 (March) 1938.

prepared in an establishment operating under federal inspection or equally competent state or local inspection. The Bureau of Animal Industry of the U. S. Department of Agriculture prescribes definite processing conditions that make such meat and meat products safe. Pork products of this type originating in meat-packing establishments which do not have federal meat inspection or its equivalent or coming from farms should always be thoroughly cooked.

### SUMMARY

1. The disease trichinosis and nonclinical and subclinical infections with Trichinella spiralis are generally acquired by man as a result of eating inadequately cooked pork containing living larvae.

2. The results of recent necropsy surveys have shown that in about 18 per cent of the diaphragms examined trichinella larvae were present. So far as known, none of the cases had a certain history of clinical trichinosis.

3. The presence of trichinella larvae in a host does not necessarily mean that the host ever exhibited clinical symptoms. It appears that the intensity of infection must be high to produce clinical symptoms. In the light of the survey data, heavy infections are apparently not common, and the figures do not support the conclusion that millions of persons in the United States have the disease trichinosis.

4. According to published information, the total number of clinical cases of trichinosis recorded in the United States from 1842 to 1937 amounts to between 5,000 and 6,000.

5. The symptoms of trichinosis are dependent to a large extent on the location of the parasite within the host. The first stage of the disease is known as the period of invasion and corresponds to the intestinal phase of the parasite's life history. The second stage has been designated the period of dissemination and corresponds to that phase of the life cycle in which the larvae are being distributed to the muscle by the general circulation. The third stage is known as the period of encystment and corresponds to the muscle phase of the disease. These stages are not sharply defined and may overlap.

6. There is no specific treatment for trichinosis. Preventive measures must be employed in coping with the problem. In a program designed to control and eradicate Trichinella spiralis in man, there are two effective measures: (*a*) direct control by adequate and thorough cooking of all pork not specially processed in a manner adequate to destroy the larvae, and (*b*) indirect control by eliminating the source of infection of swine. This may be accomplished as follows: (1) All pork scraps that are to be used for garbage should be cooked. This does not necessarily mean that all garbage should be cooked, but it does mean that uncooked pork scraps should not be allowed in the garbage. If this is not practicable, garbage should be cooked before it is fed to hogs. (2) Access of hogs to all other trichinella-infected animal tissues should be prevented.

7. Much confusion has resulted from a failure to differentiate between trichinosis as a disease and the presence in man of trichinella larvae unaccompanied by apparent illness. This statement is made in no spirit of condoning the wide occurrence of larval infections in human beings.

8. Earnest efforts are being made by those concerned to abate and ultimately eradicate trichinella infections in human beings.

407 South Dearborn Street.

## THIRD ANNUAL SUMMARY OF FOURTH OF JULY INJURIES

### DUE TO FIREWORKS AND EXPLOSIVES

### SECOND SERIES

As in each of the previous two years,[1] the American Medical Association has compiled a summary of injuries resulting from the celebration of the Fourth of July with fireworks in 1939. These reviews represent a resumption of similar summaries which were published from 1903 to 1916 and were discontinued in the latter year because of the reduction in the number of such injuries. Unfortunately the great increase in fireworks injuries has again made this problem a matter of serious public importance.

### DEATHS

In 1939 there were thirteen deaths reported as directly due to the celebration of the Fourth of July with fireworks and other explosives. The distribution by states is given in table 1. There were five fewer deaths than in 1938, an improvement apparently due in large part to Pennsylvania, which in 1938 led all other states with six deaths from fireworks and which in 1939 possessed a statewide law banning fireworks and recorded no deaths. Again, as in 1937 and 1938, there were two principal causes of death: mutilations received by boys or men as the result of explosions from home-made explosives, and burns suffered by little girls whose dresses were ignited from sparklers or firecrackers. One boy died as a result of dropping a match into a bottle of powder, which exploded, a splinter of glass piercing his neck and severing the carotid artery. Another died from severance of the jugular vein by a sliver of tin from a 5 quart oil can when a firecracker was set off inside. A Florida youth

TABLE 1.—*Deaths by State*

| State | 1939 | 1938 | 1937 |
|---|---|---|---|
| California | 2 | 0 | 1 |
| Connecticut | 0 | 1 | 0 |
| Florida | 1 | 0 | 1 |
| Idaho | 0 | 0 | 6 |
| Illinois | 1 | 1 | 0 |
| Indiana | 1 | 3 | 0 |
| Maryland | 1 | 2 | 1 |
| Massachusetts | 2 | 0 | 2 |
| Mississippi | 0 | 1 | 0 |
| New Jersey | 1 | 0 | 1 |
| New York | 3 | 2 | 3 |
| Ohio | 0 | 1 | 1 |
| Pennsylvania | 0 | 6 | 0 |
| Rhode Island | 0 | 0 | 1 |
| Texas | 1 | 0 | 1 |
| Utah | 0 | 0 | 2 |
| West Virginia | 0 | 1 | 0 |
| Totals | 13 | 18 | 20 |

TABLE 2.—*Recapitulation of Total Injuries by Type*

| Injuries | 1939 | 1938 | 1937 |
|---|---|---|---|
| Burns and lacerations | 5,305 | 7,458 | 6,858 |
| Loss of vision of one or both eyes | 19 | 43 | 16 |
| Injury to eye | 158 | 281 | 294 |
| Loss of finger, hand or other member | 41 | 80 | 37 |
| Internal injury, fracture or other serious accident | 37 | 71 | * |
| Total injuries | 5,560 | 7,933 | 7,205 |

* Not classified.

1. First Annual Summary of Fourth of July Injuries, J. A. M. A. **109**: 1806 (Nov. 27) 1937. Second Annual Summary of Fourth of July Injuries, ibid. **112**: 236 (Jan. 21) 1939.

was killed when a keg of black powder, from which he was making fireworks, exploded. In spite of the deaths of three little girls in South Bend, Ind., in 1938, Indiana's new fireworks legislation did not become effective until after the 1939 Fourth of July: an 8 year old girl in Whiting, Ind., died from burns received when her dress was ignited by a firecracker thrown by a playmate.

### TETANUS

In 1937 and 1938 two cases of tetanus were reported each year. This year, however, no report of tetanus due to fireworks injury has been received. Undoubtedly its rarity is due more to the almost universal use of tetanus antitoxin following lacerating injuries than to lack of exposure.

TABLE 3.—*Injuries, by Type, Caused by the Celebration of the Fourth of July with Fireworks and Other Explosives*

| State | 1939 Burns and Lacerations | 1939 Loss of Vision of One or Both Eyes | 1939 Injury to Eye | 1939 Loss of Finger, Hand or Other Member | 1939 Internal Injury, Fracture or Other Serious Accident | 1939 Total Injuries | 1938 Total Injuries | 1937 Total Injuries |
|---|---|---|---|---|---|---|---|---|
| Alabama | 16 | .. | ... | 1 | .. | 17 | 15 | 7 |
| Arizona | 29 | .. | 1 | .. | .. | 30 | 16 | 32 |
| Arkansas | 2 | .. | ... | 1 | .. | 3 | 2 | 7 |
| California | 619 | 1 | 19 | 4 | 7 | 650 | 509 | 485 |
| Colorado | 8 | .. | 2 | .. | .. | 10 | 21 | 119 |
| Connecticut | 188 | .. | 8 | 1 | 4 | 201 | 125 | 104 |
| Delaware | 21 | .. | 1 | .. | .. | 22 | 39 | 25 |
| Dist. of Columbia | 52 | .. | 2 | 1 | 2 | 57 | 31 | 78 |
| Florida | 59 | .. | 3 | .. | .. | 62 | 29 | 23 |
| Georgia | 4 | .. | ... | .. | 1 | 5 | 7 | 9 |
| Idaho | 6 | 1 | ... | .. | .. | 7 | 5 | 52 |
| Illinois | 430 | 1 | 21 | 5 | 1 | 458 | 513 | 485 |
| Indiana | 188 | 1 | 7 | 1 | 1 | 198 | 346 | 278 |
| Iowa | 5 | .. | 1 | .. | .. | 6 | 6 | 76 |
| Kansas | 59 | .. | ... | 2 | .. | 61 | 74 | 93 |
| Kentucky | 6 | .. | ... | .. | .. | 6 | 11 | 61 |
| Louisiana | 12 | .. | ... | .. | .. | 12 | 2 | 12 |
| Maine | 59 | .. | ... | .. | .. | 59 | 75 | 67 |
| Maryland | 156 | .. | 9 | 2 | 2 | 169 | 110 | 123 |
| Massachusetts | 297 | 2 | 29 | 4 | 1 | 333 | 467 | 376 |
| Michigan | 119 | 2 | 1 | 1 | 3 | 126 | 107 | 190 |
| Minnesota | 146 | 1 | 3 | 1 | 1 | 152 | 143 | 89 |
| Mississippi | ... | .. | ... | .. | .. | 0 | 1 | 0 |
| Missouri | 352 | .. | 3 | 1 | 1 | 357 | 553 | 510 |
| Montana | 36 | .. | 1 | 1 | .. | 38 | 30 | 50 |
| Nebraska | 15 | .. | 1 | 1 | .. | 17 | 14 | 49 |
| Nevada | .. | .. | ... | .. | .. | 0 | 1 | 0 |
| New Hampshire | 21 | 1 | 3 | .. | .. | 25 | 32 | 40 |
| New Jersey | 111 | .. | ... | .. | 1 | 112 | 88 | 72 |
| New Mexico | 4 | .. | 1 | .. | .. | 5 | 5 | 1 |
| New York | 1,473 | 1 | 11 | 4 | 2 | 1,491 | 1,630 | 1,371 |
| North Carolina | 8 | .. | ... | .. | .. | 8 | 2 | 4 |
| North Dakota | 2 | .. | ... | .. | .. | 2 | 8 | 14 |
| Ohio | 319 | 3 | 8 | 4 | 3 | 337 | 585 | 353 |
| Oklahoma | 29 | 1 | 1 | 1 | .. | 32 | 43 | 101 |
| Oregon | 23 | 1 | 2 | 1 | .. | 27 | 29 | 45 |
| Pennsylvania | 74 | .. | 5 | 2 | 4 | 85 | 1,702 | 991 |
| Rhode Island | 179 | 1 | 1 | .. | .. | 181 | 210 | 381 |
| South Carolina | 2 | .. | ... | .. | .. | 2 | 3 | 0 |
| South Dakota | 13 | .. | ... | 1 | .. | 14 | 8 | 9 |
| Tennessee | 6 | .. | ... | .. | .. | 6 | 9 | 1 |
| Texas | 26 | 1 | 4 | .. | .. | 31 | 60 | 33 |
| Utah | 5 | .. | ... | .. | .. | 5 | 18 | 31 |
| Vermont | .. | .. | ... | .. | 1 | 1 | 2 | 20 |
| Virginia | 3 | .. | 1 | 1 | 1 | 6 | 13 | 18 |
| Washington | 60 | .. | 5 | .. | 1 | 66 | 70 | 153 |
| West Virginia | .. | .. | ... | .. | .. | 0 | 41 | 28 |
| Wisconsin | 62 | 1 | 3 | .. | .. | 66 | 117 | 92 |
| Wyoming | 1 | .. | 1 | .. | .. | 2 | 6 | 10 |
| Unknown | .. | .. | ... | .. | .. | 0 | 0 | 37 |
| Totals | 5,305 | 19 | 158 | 41 | 37 | 5,560 | 7,933 | 7,205 |

### SERIOUS INJURIES

Again newspaper clippings and hospital questionnaires record numerous serious and extraordinary injuries resulting from fireworks. There was a slight reduction, however, in the number of persons receiving eye injuries or sustaining loss of vision of one or both eyes (table 2). Five boys in New York, attempting to make a giant firecracker, were seriously burned and injured when it exploded; one had his left hand blown off.

### INJURIES

Table 3 lists the injuries recorded from fireworks in 1939 and in parallel columns the injuries for 1937 and 1938. As in previous years, these figures do not take into consideration those hospitals which failed to report or those accidents treated in physicians' offices and therefore must obviously err on the side of underestimation.

Far and away the most striking reduction in number of fireworks injuries occurred in Pennsylvania, which state received the benefit of a new law barring fireworks. This year Pennsylvania reported only eighty-five injuries from fireworks as contrasted with 1,702 the previous year, and no deaths as contrasted with six in 1938. No more convincing demonstration of the effectiveness of an enforced state law banning the use of fireworks could be obtained. Indiana, however, another bad state in 1938, recording that year 346 injuries and three deaths, enacted a bill which was not made effective until after the 1939 Fourth of July. That celebration resulted therefore in one death and 198 injuries of varying grades of severity. Many of the states with laws banning fireworks have continued to maintain satisfactory records, including Iowa, Wisconsin, Michigan and New Jersey. In both New Jersey and Michigan, however, the upward trend (table 3) is evidence of a necessity for constant attention to enforcement. Utah, although accounting for a relatively small number of injuries in previous years, has further reduced the total (and enormously so on a percentage basis) by the model law which was enacted prior to July 4, 1939. Maryland, with bad records in previous years, again has failed to improve. In 1937 there were one death and 123 injuries, in 1938 two deaths and 110 injuries, and in 1939 one death and 169 injuries. Newspaper reports state that a model bill banning fireworks passed the Maryland house of representatives but was defeated in the senate by a vote of 15 to 14! Comments are superfluous. Rhode Island, the District of Columbia and Connecticut also have bad records, with 26.6, 14.2 and 12.6 injuries per hundred thousand of population respectively—the highest rates in the country. California and New York (table 3) together account for nearly one third of all injuries in the country. The Southern group of states again reported few injuries from fireworks. As previously indicated, this is due to the fact that in most sections of the South the Fourth of July is not greeted with fireworks. The Christmas season is often accom-

TABLE 4.—*Injuries in Principal Cities*

| City | 1939 Injuries | 1939 Rate per 100,000 | 1938 Injuries | 1938 Rate per 100,000 | 1937 Injuries | 1937 Rate per 100,000 |
|---|---|---|---|---|---|---|
| Kansas City, Mo.* | 243 | 60.83 | ... | ..... | ... | ..... |
| Los Angeles | 258 | 20.91 | 180 | 14.59 | 45 | 3.63 |
| Baltimore | 135 | 16.75 | 68 | 8.43 | 56 | 6.95 |
| New York | 828 | 11.85 | 1,008 | 14.43 | 524 | 7.56 |
| St. Louis | 76 | 9.24 | 295 | 35.88 | 322 | 39.17 |
| Boston* | 71 | 9.01 | ... | ..... | ... | ..... |
| Chicago | 226 | 6.69 | 176 | 5.21 | 225 | 6.66 |
| Cleveland | 42 | 4.66 | 129 | 14.32 | 64 | 7.11 |
| Detroit | 65 | 4.13 | 22 | 1.39 | 62 | 3.95 |
| Philadelphia | 23 | 1.17 | 418 | 21.22 | 201 | 10.30 |

* Not classified in former years.

panied by explosive celebration and the accident toll at that time is considerable in some states.

Another area of striking improvement is St. Louis, which in 1938 recorded 295 injuries and in 1939, with the enactment of an ordinance against fireworks, only seventy-six. This may be contrasted with the record of Kansas City, in the same state and with less than half the population of St. Louis, which had 243 injuries in 1939. Comparable figures for Kansas City in previous years were not analyzed separately (table 4).

### COMMENT

The effectiveness of adequate state legislation in enormously reducing the toll of fireworks injuries is especially well illustrated in this report in the case of Pennsylvania and, on a smaller scale, in the cases of Utah and West Virginia. The danger of postponing the effective date of legislative enactments is clearcut in the cases of Indiana and Maryland. With some notable exceptions, as evidenced in table 4, only those states which have enacted and enforced statewide laws have shown satisfactory evidence of control. The need for continued enforcement in those states with adequate laws is, however, also evident. The facts and figures presented completely illustrate the need for additional legislation and enforcement. There is no longer any excuse for failure to adopt effective state legislation.

---

## *Council on Physical Therapy*

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORT. HOWARD A. CARTER, Secretary.

### LIEBEL-FLARSHEIM SW-P SHORT WAVE GENERATOR ACCEPTABLE

Manufacturer: The Liebel-Flarsheim Company, 303 West Third Street, Cincinnati.

Designed for medical and minor surgical diathermy, the SW-P Short Wave Generator is a portable model in a carrying case, provided with a handbag for accessories and a special cabinet to contain the unit during office use. Standard accessories include an inductance cable and condenser pad, while optional equipment includes air-spaced plates on adjustable arms, cuff and sinus applicators and electrosurgical accessories. The net weight of the unit itself is 45 pounds, the net weight of the unit in the cabinet is 112 pounds, the shipping weight of the unit itself is 136 pounds and the shipping weight of the cabinet and unit is 212 pounds.

The unit incorporates a tuned-plate, tuned-grid circuit, generating energy at a wavelength in the ultrashort range of about 7 meters. The patient circuit is inductively coupled to the oscillator, and a variable condenser in the patient circuit provides for resonating with the oscillator. Two Amperex P-150 oscillator tubes and two 996 rectifier tubes are used. A filter is employed to minimize any possible radio interference. The tubes and circuits are protected from an overload by a device which automatically reduces the power and gives an audible signal to the operator when too great a power input is employed.

The firm submitted the following data on energy output measurements from the patient circuit:

*Calorimeter Method.*—The temperature rise induced in a given amount of water in a given time indicates an average output of 200 watts.

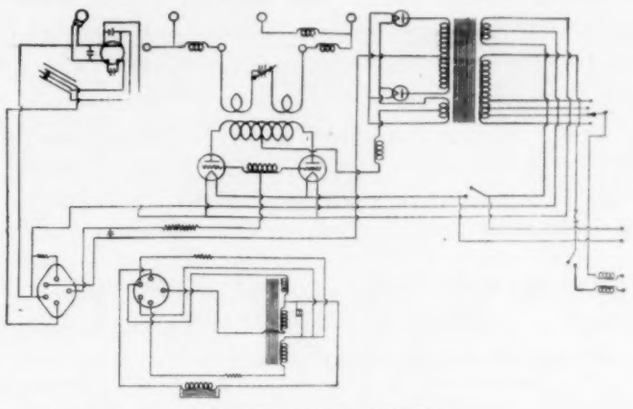
*Photoelectric Cell Method.*—When two 100 watt bulbs are arranged in parallel, measurement of light indicates an average output of 235 watts.

Tests carried out for the Council showed that these results could readily be confirmed and that the temperature rise on the outside windings of the transformer after the machine had been operated for two hours at full load was within the limits of safety.

The firm submitted a series of tests from a recognized hospital to provide evidence as to the performance of the unit in providing heat deep within the human body, as follows:

All treatments were given for twenty minutes to the patient's tolerance. Initial oral temperatures were all within normal range.

*Air-Spaced Plate Technic.*—Two disks—one 5½ inches in diameter and one 9½ inches in diameter—were applied in a plane to the anterior portion of the thigh and curved so that



Schematic diagram of circuit.

each portion of the combined plates was approximately the same distance from the skin surface. The proximal edges of the disks were spaced one-half inch, at which point the thermocouple was inserted. Both disks were spaced approximately 1½ inches from the patient's skin. The average deep-muscle temperatures for six tests were 97.6 F. initial and 105.6 F. final.

*Inductance Cable Technic.*—Four turns of the inductance cable were wrapped round the thigh with approximately 1½ inches of turkish toweling beneath for spacing. Two turns were taken high up on the thigh, then approximately 2 inches of spacing was allowed for the thermocouple needle and two more turns were taken below that point. The average deep-muscle temperatures for six tests were 98.1 F. initial and 106 F. final.

*Cuff Technic.*—Two cuff electrodes were wrapped around the thigh by means of turkish toweling to a total thickness of approximately 1½ inches with a 2 inch space between the proximal edges, at which point the thermocouple was inserted. The average deep-muscle temperatures for six tests were 98.1 F. initial and 106.3 F. final.

*Pad Technic.*—Two pad electrodes were curved around the thigh with turkish toweling spacing of a thickness of approximately 1½ inches with a space between the proximal edges of 1 inch, at which point the thermocouple was inserted. The average deep-muscle temperatures for six tests were 98.4 F. initial and 105.2 F. final.

Liebel-Flarsheim SW-P Short Wave Generator, Cabinet Model.

A Chapman orificial unit also was used. This electrode was drilled out so that a thermometer could be passed through and actually come in contact with the cervical tissue. The electrode was connected to the pad terminal *I* by means of a special orificial cord to be used with this machine. For the return path, the standard 6 by 8½ inch pad was plugged into the pad terminal marked *C* and spaced approximately 3 inches above the lower part of the abdomen by means of felt spacers. The average orificial temperatures for six tests were 102.8 F. initial (after five minutes) and 109.3 F. final (after twenty minutes).

The unit was investigated by the Council clinically and found satisfactory for clinical practice.

In view of the foregoing report, the Council on Physical Therapy voted to accept the Liebel-Flarsheim SW-P Short Wave Generator for inclusion on the Council's list of acceptable devices.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, JANUARY 6, 1940

## THE PLATFORM OF THE AMERICAN MEDICAL ASSOCIATION

**The American Medical Association advocates:**

**1. The establishment of an agency of the federal government under which shall be coordinated and administered all medical and health functions of the federal government exclusive of those of the Army and Navy.**

**2. The allotment of such funds as the Congress may make available to any state in actual need, for the prevention of disease, the promotion of health and the care of the sick on proof of such need.**

**3. The principle that the care of the public health and the provision of medical service to the sick is primarily a local responsibility.**

**4. The development of a mechanism for meeting the needs of expansion of preventive medical services with local determination of needs and local control of administration.**

**5. The extension of medical care for the indigent and the medically indigent with local determination of needs and local control of administration.**

**6. In the extension of medical services to all the people, the utmost utilization of qualified medical and hospital facilities already established.**

**7. The continued development of the private practice of medicine, subject to such changes as may be necessary to maintain the quality of medical services and to increase their availability.**

**8. Expansion of public health and medical services consistent with the American system of democracy.**

## HEAT AND THE NUTRITIVE VALUE OF PROTEINS

The custom of cooking food is as old as the knowledge of fire. Doubtless heat was first applied in the preparation of food to improve the flavor and for hygienic reasons, but it is commonly believed also that cooking facilitates digestion. Although favorable therapeutic effects have been claimed when an uncooked dietary regimen is followed for short periods, an exclusively raw diet is recognized as unsuited for human use. The detailed study of the influence of controlled heating on the nutritive value of foodstuffs has been undertaken comparatively recently. The proteins in whole wheat, bread and prepared cereal foods were early shown to undergo changes, when toasted, that resulted in a decrease in biologic value. The nutritive value of the crust of bread was shown to be less than that of the crumb as far as protein was concerned.[1] Later the changes in meat protein were examined from the same point of view; the ability to maintain nitrogen balance in adult animals and to support growth in the young was generally inversely proportioned to the duration and intensity of heating.[2]

Attention was next turned to purified proteins. Casein was subjected to controlled heating and the biologic value of the products examined. Definite damage was produced by dry heat at 150 C. for half an hour; the cause lies not in a decrease in digestibility but in some change in the histidine and lysine which renders these indispensable amino acids largely unavailable in nutrition.[3] A similar investigation of purified edestin, a protein from hemp seed, has indicated again that autoclaving makes such an alteration in the protein that 1 per cent of added lysine is needed to restore its biologic value.[4]

In direct contrast to the situation discussed in the foregoing paragraphs is the effect of heat on the availability of the proteins in certain leguminous seeds. The protein of the navy bean has a low biologic value and cooking brings about a definite improvement. Of late similar observations have been made on the protein of soy beans. When fed raw, this protein has relatively low biologic value; but the meal, which results from the extraction of the oil under heat and pressure, contains protein of high quality, as shown by animal feeding experiments.[5] Addition of cystine to raw soy bean improves the nutritive value of the protein. Johnson, Parsons and Steenbock [6] have found that the sulfur and nitrogen containing components of the raw soy beans are digested and absorbed normally but that the ultimate retention of these compounds is much greater when the soy beans are heated. On the raw soy bean regimen the percentage distribution of the sulfur in the urine was normal, indicating that the mechanism of catabolism was normal but probably that in the raw soy bean protein there exists a sulfur and nitrogen complex which is absorbable but not susceptible of normal metabolism. Heating appears to break up this complex, rendering the parts available.

The investigation of the effect of heat on the biologic value of proteins indicates that this is a factor to be considered in nutrition, although it should be remembered that thus far such effects have been demonstrated only with relatively drastic heating. Nevertheless the as yet undefined alteration with the protein molecule and the correlated nutritional deficiency suggest new possibilities regarding the mechanism of protein metabolism.

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## VITAMIN P

In 1936 Szent-Györgi and his collaborators [1] established the presence in extracts of Hungarian red pepper and later in lemon juice of substances other than ascorbic acid which could control the hemorrhage that occurs in the course of a variety of conditions Ascorbic acid, even in excess, was ineffective. Later it was reported from the same laboratory [2] that fractionation of the curative extracts had demonstrated that the active substance was present in a fraction consisting of practically pure flavone or flavone glucoside. The potency of the latter fraction was confirmed by the demonstration that the continued daily intravenous administration of the concentrate in clinical cases that were characterized by an increased permeability or fragility of the capillary wall restored the normal capillary resistance in a relatively short time. The results led to the suggestion that the large group of vegetable pigments the flavones or flavonals have an important part in animal life and that they are of vitamin nature. The name vitamin P was given to the substance responsible for the action on vascular permeability. The flavones should not be confused with the flavins, one of which, in combination with a carbohydrate, is vitamin $B_2$.

The claim for the vitamin-like nature of the flavones appeared to be supported by the experimental demonstration [3] in guinea pigs of an increased survival time in animals on a scorbutic diet that received supplements of vitamin P concentrates. There were fewer hemorrhages present at necropsy in the treated animals than in control guinea pigs that received the unsupplemented scorbutic diet. However, efforts to confirm these data in experimental animals yielded conflicting results. The most serious objection has come from the careful investigations of Zilva, whose extensive experience with experimental scurvy warrants careful consideration of his results. This investigator reported [4] an inability to delay the onset of scurvy or the fatal termination of the disease in guinea pigs by the administration of purified vitamin P preparations prepared according to Szent-Györgyi. Similar negative results have been reported by Moll.[5] Indeed, Szent-Györgyi [6] has stated that negative data have been obtained in his laboratory in a later effort to repeat the early experiments with scorbutic guinea pigs. Experiments with guinea pigs designed to establish the existence of a dietary essential other than ascorbic acid as a necessary factor for the maintenance of the normal capillary resistance are complicated by the high requirement of the guinea pig for vitamin C, a requirement that apparently overshadows the need for other dietary essentials. The pathologic state that rapidly develops in scorbutic pigs makes it difficult to evaluate the statement of Szent-Györgyi and his colleagues that experimental scurvy is a deficiency disease caused by the combined lack of vitamins C and P.

As definite conclusions regarding the requirements for a dietary essential other than vitamin C for the maintenance of normal capillary integrity cannot be drawn from guinea pig experiments, evidence for the existence of vitamin P must rest on the original clinical observations and the successful repetition of these results. Data of this type are now available in the recent well planned experiments of Scarborough.[7] The patients used in this investigation all had abnormally increased capillary fragility, which from the clinical history, appeared to be definitely related to a dietary deficiency. The degree of capillary fragility was established for each case and the diet then adjusted to contain supplements of either fresh fruit, a mixture of vitamins A (oral), $B_1$ (parenteral), C (oral) and D (oral), a crude flavone fraction from orange juice, a purified flavone preparation, or a solution of flavones prepared from orange peel according to the method of Szent-Györgyi. A definite increase in the resistance of capillary walls to the application of pressure (both negative pressure, suction and positive pressure tests were employed) was obtained only in those instances in which the flavone-containing extracts were employed. This improvement was obtained when the orange or lemon juice concentrates were given by mouth, by intramuscular injection or through the rectum. The administration of ascorbic acid by mouth or by injection failed to produce this beneficial effect, whereas increased capillary resistance was evident in all instances following the use of vitamin P concentrates, including cases in which ascorbic acid was inefficacious.

The experiments of Scarborough appear to establish more definitely the possible existence of a dietary factor that is essential for the maintenance of capillary resistance. The capillary fragility present in the clinical cases studied was not ameliorated by ascorbic acid and the evidence clearly indicates the nonidentity of the latter vitamin with vitamin P. The precise chemical nature of the substance or substances present in the concentrates which Scarborough employed has not been established but the investigations cited earlier indicate their flavone nature. It is a matter of future investigation to establish unequivocally the nutritional significance of vitamin P, to demonstrate more clearly the mode of action of this dietary adjunct and to elucidate its chemical nature. Of considerable interest also is the possible physiologic relationships of vitamin P to the antihemorrhagic factor vitamin K, which by virtue of its physiologic effects must also be related to capillary integrity.

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# Current Comment

## THE SECOND ANNUAL CONGRESS ON INDUSTRIAL HEALTH

One of the main objectives of the Council on Industrial Health is dissemination of information to the medical profession about important developments in the field of health control of workers. In keeping with this intention, the second Annual Congress on Industrial Health has been arranged; the program appears on page 61 of this issue of THE JOURNAL. The first of these congresses was devoted largely to orientation in a rapidly expanding field, emphasizing particularly the extent of participation already undertaken by governmental, medical and other interested organizations. The second congress devotes time to symposiums on syphilis in industry, evaluation of disability and industrial physical examinations. Other presentations will include a discussion of the shortcomings of rehabilitation of the physically disabled from the point of view of all participating agencies—the physician, the compensation authorities and the rehabilitation groups themselves. The subject of mental hygiene in industry will be introduced, in keeping with its growing usefulness in the field of personnel relationships and as an important development in the application of medical and protective health measures among employed groups. Similarly the influence of nutrition on physical standards of working people will be presented as a factor of first significance in the improvement of health in all segments of the population, more important in the opinion of many students than the direct effects of occupation alone. A special invitation to attend has been directed to members of committees on industrial health in the state and county medical societies; time has been set aside for discussion with such representatives of matters of organization, present programs and future activities.

## CHRONIC MALARIA

Chronic malaria is a disease frequently lacking in the classic picture of infection characterized by chills and fever. The Fondés [1] in a recent article on this subject classify it into two varieties, one of which embraces a latent, an atypical and a typical late phase. In this form the defensive forces are more or less vigorously operative and the progress of the disease is arrested because of prompt destruction of parasites by a highly developed immune mechanism. This condition frequently remains unrecognized, and the characteristic lower level of vigor is passed off as some individual characteristic or idiosyncrasy. In the second form—nonreactive chronic malaria—the patient is ill, disabled and confined to bed, but demonstration of the parasites in the blood is rarely possible. The temperature is normal or subnormal for the greater part of the time and often the dry copper-colored skin is the only clinically recognizable diagnostic feature. The practical diagnosis of chronic malaria, the Fondés point out, rests in part on an exhaustive history for previous attacks of malaria and complete physical examination, which generally discloses a muddy, subicteric tint of the skin and scleras, coated tongue, general pallor and, frequently, enlargement of the spleen. The provocative drug test, with full doses of quinine or atabrine for one day, followed by recognizable symptoms within a few days to three weeks, is, they say, the most valuable method of determining malaria in atypical and latent phases. The most commonly useful laboratory observation incriminating malaria is stippling of the red cells twenty-four hours after an attack and definite increase of the eosinophils. The management of chronic malaria, they say, demands a prolonged plan of treatment, using either atabrine or quinine in alternate courses provided there is no contraindication to either drug. Present methods of approach in preventing the spread of malaria are inadequate, they believe, and the solution, as applied to the community, lies in thorough treatment of the individual patient. Efforts should therefore be directed at this group of plasmodic carriers, which are abundantly present.

1. Fondé, G. H., and Fondé, E. C.: Chronic Malaria, Arch. Int. Med. **64**: 1156 (Dec.) 1939.

## THE FOURTH OF JULY RECORD

Statistics on the injuries from fireworks and firearms in 1937 and 1938, occurring by way of celebration of the Fourth of July, have been collected and published in THE JOURNAL.[1] Again in 1939 these figures have been compiled and are presented in this issue (page 39). In 1939 the number of deaths from fireworks was thirteen, as contrasted with eighteen in 1938 and twenty in 1937. The number of injuries recorded has also shown an appreciable reduction, particularly in certain states which have enacted satisfactory control legislation. Three states in particular, Pennsylvania, Utah and West Virginia, clearly demonstrated the effect on human life and limb of adequate legislation satisfactorily enforced. In one state, Indiana, with previous bad records, a control bill was passed but did not become effective until after the 1939 Fourth of July; that state recorded one death and 198 injuries. In another state, Maryland, an adequate control law passed the house, according to newspaper reports, but was defeated in the senate by a vote of 15 to 14; Maryland reported one death and 169 injuries. The need for satisfactorily drawn legislation and active enforcement remains obvious. Only recently, according to newspaper reports, the movement to obtain "safe and sensible control" of the sale and use of fireworks has received added impetus by the adoption of a resolution by twenty-five public officials at a conference on interstate cooperation, urging the Council of State Governments to draft a model law for the control of fireworks. It was pointed out that one state alone is relatively helpless in the matter of fireworks control and that by way of example it was apparent that the effect of a prohibition on the sale of fireworks in New York City had been nullified by the sale in adjacent communities. These points have been repeatedly emphasized by the American Medical Association in commenting on the control of fireworks. Obviously both additional legislation and continued emphasis on enforcement are necessary in order to avoid the tragedies resulting from this almost completely controllable situation.

1. First Annual Summary of Fourth of July Injuries, J. A. M. A. **109**: 1806 (Nov. 27) 1937. Second Annual Summary of Fourth of July Injuries, ibid. **112**: 236 (Jan. 21) 1938.

# ORGANIZATION SECTION

## MEDICAL CARE FOR MIGRATORY WORKERS

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Migration, in a broad sense, has characterized the development of the United States from its beginning. Untouched natural resources kindled the hopes, imagination and pioneering spirit of the early generations to leave benefits incident to the more settled communities for the anticipated fruits of vast unexploited fields. These pioneers exhibited daring, courage and vision; they were willing to undergo hardship to demonstrate the opportunities which awaited in a new country. Until recently these opportunities for individual improvement were realistic. Gradually this type of migration, so necessary in the pioneering development of a new country, extended to practically every remaining frontier; but with the exploration and utilization of land and natural resources, migration was not to cease—it was to assume a very different form with the coming generations.

Migrants move nowadays because of dissatisfaction with their economic status; they change residence because of glowing reports of greener "distant fields"; they leave a settled home in the belief that a change of climate will be beneficial to the health of some member of the family; they change residence to join friends or relatives from whom they dislike to be separated; they flee the environment that had been the scene of domestic trouble and they find numerous other excuses, valid or fanciful, that lose for them their stability and gain the uncertain status of the transient.

Between 1920 and 1930 the net loss in rural population through migration ranged from 7.9 per cent in the Middle Atlantic to 15.8 per cent in the East South Central states. All except eight states showed decreases in rural population with the heaviest losses in the North Central and Southern states. Only the Pacific states experienced an actual increase in rural population through migration. On a county basis, 2,542 counties lost and only 517 counties gained rural population during this decade.[1]

The annual net migration from farms for the period 1930 through 1934 averaged 120,000 persons in comparison with an annual average of 600,000 persons during the decade preceding 1930.[1]

The migration of today is difficult to explain because of the complexity of motivation. The term implies a wide range of movement which begins just beyond absolute stability and extends to almost continuous mobility. Studies of population movements are of considerable importance to a better understanding of many current social, economic and industrial problems. Such studies could be made to include even the movement within city boundaries, but for this study only the groups of migratory workers who live and work on the road are to be considered.

Transience has been a recognized social problem for many years, but its nature and extent during recent times were first disclosed during the operation of the Federal Emergency Relief Administration. From September 1933 to September 1935 the Federal Emergency Relief Administration gave relief to approximately 200,000 transient families comprising about 700,000 persons.[2]

Among the many factors which influence families to leave a settled residence are, in order of importance, unemployment, ill health, farm failure, inadequate earnings, domestic trouble, and dislike of separation from friends or relatives. These conditions account for about 76 per cent of the reasons for leaving settled residences. Studies indicate that more than three fourths of migrant families declare economic betterment to be the objective which they hope to realize at their destinations.

Maps showing the state of origin of migrant families indicate that there was in 1935 a considerable movement out of and into most of the states.

The direction of movement of migrant families in 1935 was still predominantly westward. The flow of families into California, Colorado, Washington, Oregon, Idaho, Kansas and New Mexico far exceeded all other net movements. A statement of net population changes as of June 1935 shows that, of the net displacement gain of 10,524 families for the United States, California gained 4,803 and Colorado 1,009; the greatest net loss, 2,027 families, was found in Oklahoma.[3]

The study of 1935 migration revealed that two fifths of all migrant families had first applied for transient relief in the community where they had been residing. This indicates that a large percentage of migrant families had completed their migration before applying for transient relief.

From the point of view of public assistance, it is necessary to distinguish between chronic wandering, which characterizes the type of persons to whom stability has become either impossible or unattractive, and migration which is generally a purposeful movement with stability as its objective.[4]

The study of the 1935 samples of migrant families summarizes the personal characteristics of the migrant group as follows:

1. Youth was a clearly defined characteristic of the economic heads of migrant families. One half were under 35 years of age, and four fifths were under 45. In contrast, only one third of the heads of all resident relief families were under 35, and only three fifths were under 45. Among male heads of families in the general population about one half were under 45. This distribution indicates the presence of many infants and school-age children in the migrant families; and, indeed, four fifths of the children in these families were under 15 and one third were under 5 years of age.

2. Migrant families were small families. Well over half contained only two or three members. The average family size was 3.1 persons, significantly less than the size of both resident relief families and families in the general population (excluding one-person families).

3. Migrant families were preponderantly native-born white families. By comparison with the general population, foreign-born and Negro migrant family heads were underrepresented. These two minority groups were overrepresented, however, in

1. Rural Migration in the United States, Works Progress Administration, Division of Research, 1939, p. xvi.

2. Migrant Families, Works Progress Administration, Division of Social Research, 1938, p. xxi.
3. Migrant Families, p. xxiii; table 6, p. 150.
4. Migrant Families, p. xxv.

the resident relief population, showing that although more frequently victims of the depression, these groups nevertheless tended to remain immobile. During recent decades the foreign born have tended to settle in large industrial centers and to group themselves according to racial or national ties. These ties have acted as deterrents to migration, despite limited economic opportunity and recurring unemployment. Moreover, local prejudice outside the highly industrialized areas makes the migration of distressed foreign born persons more difficult than of the native born. Custom and prejudice operate to restrict the mobility of Negro families just as effectively.

4. There was a small incidence of separation, widowhood and divorce among the family groups. Among migrant family heads the proportion that were separated, widowed or divorced was less than that found in the general population.

5. Migrant family members had a higher level of schooling completed than the heads of either the urban or rural resident

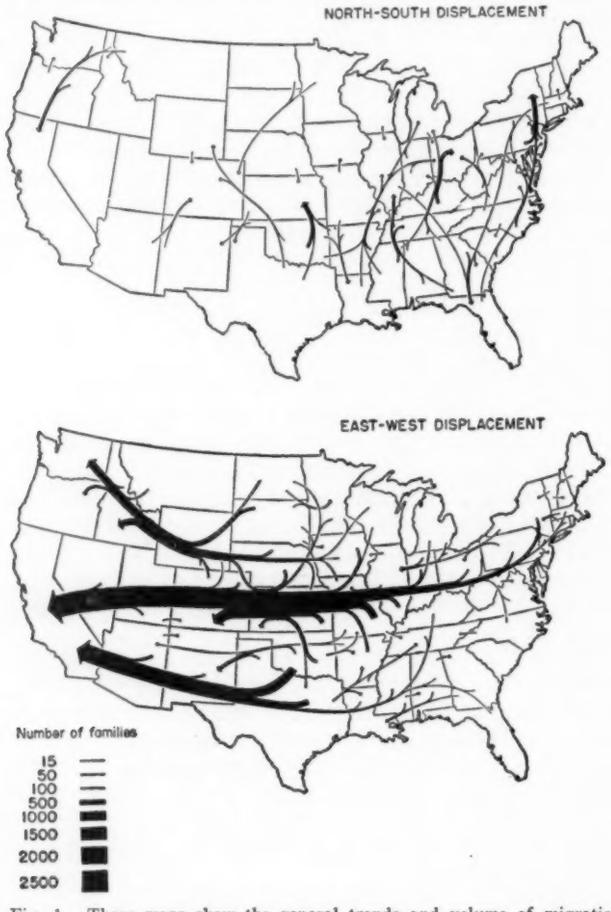


Fig. 1.—These maps show the general trends and volume of migration of families, north-south and east-west ("Migrant Families," Works Progress Administration, 1938, p. 41).

relief population. Some of the difference between the school attainment of migrant and resident relief families is attributable to the youth of the migrant group and to the under-representation of Negroes. In any event, it is clear that migration was not caused by lack of education.[5]

The flow of migration toward the West has been mentioned. The overwhelming majority of this westward flow has been into California. The border plant control stations between July 1, 1935, and September 1938 counted more than 285,000 individuals in need of manual employment who entered California by motor vehicle. The nature of California agriculture, which is industrialized and uses a greater percentage of hired labor than that in any other state, has encouraged migrant families to believe that they could find at least seasonal agricultural work to maintain themselves. During the harvest season the labor peak is from three to four times higher than at the lowest point of the year.

Some routes may serve to illustrate the surges of migration but the actual variations of individual migrations approximating these patterns are numberless. A well filled year might include picking peas in Imperial Valley in February and March, at Mipomo on the central coast in April, and in Alameda County or Yolo County in May; picking apricots in Contra Costa County in June, and in Santa Clara County in July; picking grapes in Fresno County in August and September, and peas in October; picking peas in Imperial Valley in November and December, and awaiting the maturity of the next pea crop in February. Some migrants find alternative spring employment in the citrus belt of Tulare County. For other migrants the year's work goes somewhat as follows: pea picking in Imperial Valley in February and March, potato picking or cotton chopping in Kern County in May and June, apricot picking in Kings County in July, grape picking in Fresno County in August, and cotton picking for the rest of the year in Kern County.

Filipino migrants, comprising young single men with hardly an exception, commonly work back and forth between lettuce crops in the Salinas and Imperial valleys and the grape harvest in Fresno County, or between the sugar-beet crop in the Salinas or Sacramento valleys, the asparagus crop in the Stockton Delta, and the grape harvest in the San Joaquin Valley. Filipinos practically never pick cotton.

Mexican migrants, who move typically in family groups, frequently dovetail work in lettuce and cantaloups in Imperial Valley with peach and apricot picking near Hollister or in the Santa Clara Valley, and grape picking near Fresno. Cotton picking in the San Joaquin Valley or walnut picking in Ventura County also appear in the routes as alternative employments in the fall.

Three routes actually followed by particular migrant families in 1934 may be set down as examples:

Mexican family: Salt River Valley, Ariz., for lettuce, January-March; Imperial Valley, tying carrots, March-June; Conejos, picking apricots, June; Tulare County, picking peaches, July-August; Fresno County, picking plums, August; Tulare County, picking cotton, September-November; Salt River Valley, for lettuce, November-March.

Washington family: Cazadero, for independent trapping, January-March; Yuba City, thinning peaches, March-May; Sonoma County, picking cherries, May-June; King City, picking apricots, June; Sonoma County, picking apples, June-July; Exeter, peach dry yard, July-December.

Oklahoma family: Wasco and Buttonwillow, picking cotton, planting and picking potatoes, January-August; Selma, picking peaches, August; Shafter, picking cotton, September-December; Wasco, picking cotton, December.

Except for work near Selma, in Fresno County, the year's migration of the Oklahoma family was entirely within Kern County.[6]

In 1938 the Farm Security Administration made "A Study of 6,655 Migrant Households in California." This report states that:

California normally has many migratory-casual workers employed in agriculture as a usual occupation. To this supply many resident persons who have lost former non-farm employment have been added during the depression. In addition, dispossessed families have come from other states. With the oversupply of labor thus available, wages have been depressed and individual work periods shortened. It has been difficult, if not impossible, for the worker to maintain himself on his earnings and save enough for the slack periods.

Employable persons resident in the state for one year or longer, who are in need, may obtain relief from the State Relief Administration or be certified to the Works Progress Administration, but for those without residence in California, state and local funds are not available for care except as

5. Migrant Families, pp. xxvii, xxviii.

6. Patterns of Agricultural Labor Migration Within California, United States Department of Labor, Bureau of Labor Statistics, 1938, p. 3.

very temporary emergency measures. Ever since the shutdown of the federal transient program in 1935, persons in California with knowledge of the problem have sought to find ways and means of helping the nonresident within the state who is in need.

A partial answer came in February 1938, when authority was granted the Farm Security Administration of the Department of Agriculture to disburse appropriated federal monies for direct relief to nonresident migratory agricultural workers. The purpose of the grant was to give temporary aid to nonresidents in the rural sections of the state. United States Department of Agriculture Administration order 92 (revision 2), dated Aug. 14, 1936, prescribes the conditions imposed by the Farm Security Administration for making grants to individuals in furtherance of rural rehabilitation and relief in stricken agricultural areas. Eligibility requirements as stated in administration order 92 are as follows:

"2 a I. Farm owners, farm tenants, share croppers, laborers, persons now on the official rolls of the RA and other persons who now live on farms or in farm areas and who, when last employed, received the major portion of their income from farming operations will be eligible for grants under this order, without regard to availability of suitable and adequate soil resources, and other conditions and characteristics, other than employability, ordinarily indicating potentiality for rehabilitation.

"A *Need for public aid* of persons who qualify under paragraph 2 a I thereof will be established when it has been determined through personal investigation that their material and credit resources are inadequate to meet accepted subsistence requirements, to maintain health and prevent human suffering."

According to the Administration order, grants may be made to meet emergency needs for food, fuel, clothing, shelter, indispensable medical services and other essential subsistence goods or services.

It is the policy of the Farm Security Administration to give emergency grants only to persons who are not eligible to the relief programs of other agencies within the state. The California State Relief Administration, as stated previously, accepts employable persons who are in need and who have a year or more of residence in California. The Farm Security Administration policy states, "cash grants will not be made to migratory farm labor applicants who upon investigation are found to have resided in the state of California for a year or more preceding application." Temporary aid may be given pending care by the State Relief Administration or County Welfare departments.

Under California law, unemployable persons who are in need may only be given long-time care by County Welfare departments after three years of residence in the state. Farm Security Administration grants "may not be made to clients who for health or other reasons are permanently unemployable in agriculture." However, "temporary illness or inability to work due to injury should not be considered as grounds for refusing an application or for closing a case."

During the eight month period February through September 1938, 15,410 households received Farm Security Administration emergency grants in California. Of the number who received grants at some time during this period, 12,032 cases were closed on Oct. 1, 1938. The comparatively small number of cases active October 1 may be accounted for largely by the fact that September and October are months of high agricultural labor requirements in California. As soon as the harvest season is over many of these persons will again be in need of relief.[7]

The summary of observations in this report is pertinent to an understanding of later developments in the organization of medical services for these people:

1. The 6,655 migrant households studied, receiving Farm Security Administration emergency grants in California in 1938, came to California chiefly from four states, Oklahoma, Texas, Arkansas and Missouri. More of the migrants came from Oklahoma than from any other state. It was the state of origin for 2,771 migrant households, two fifths of the total group studied.

States in the path of this westward migration, particularly Arizona, Oregon, Washington, Idaho, Colorado and New Mexico, were temporary residence of many of these migrants [pages 11-13].

2. The counties of origin of the migrant households tended to group themselves into areas of density. Such areas were not only found within states but were formed by counties of two or more adjoining states [page 17].

3. Lack of work and drought were the two major reasons for migration reported by the 6,655 migrants. Farm industrialization and mechanizations, soil destruction and the breakdown of tenancy, as well as lack of adequate local relief, and high incidence of ill health during depression years are other significant reasons for migration reported by economists [pages 26-35].

4. The heads of the migrant households had had long years of residence in their former homes prior to migration. Almost one half had lived for twenty years or longer in the states from which they came; only 17 per cent had residence of less than five years in the states from which they migrated [pages 35-37].

5. The migrants did not all come to California directly; temporary stops en route were frequently made. Approximately one half of the group had left

Fig. 2.—Ranks of fifty white migrant families June 1934-June 1935 as they followed the crop in California ("Patterns of Agricultural Labor Migration Within California," United State Department of Agriculture, Serial No. R. 840, 1938, p. 4).

their home states seven months or longer prior to receiving the Farm Security Administration emergency grant; only 28.8 per cent had been in California seven months or longer. Farm and non-farm migrant groups showed some slight differences in the length of time they had left states of origin and length of time since entering California [pages 39-44].

6. Ninety-two per cent of the migrants were white, compared with 89 per cent in the general population of the United States [page 45].

7. The heads of the migrant households were practically all men. Women as heads of households represented less than 4 per cent of the total [page 47].

8. The most usual household was comprised of three persons, two adults and a child under 5 years of age [page 54].

The distribution of the households according to size, that is, households consisting of one person, two persons, and so on, was almost identical with the percentage distribution of family size for the general population [page 50].

The children of the majority of the migrant households were young. More than half were under 10 years of age; only one fifth were 15 years of age or over [page 55].

7. A Study of 6,655 Migrant Households in California, United States Department of Agriculture, Farm Security Administration, 1939, pp. 2-5.

9. The heads of the migrant households were men in their best working years. More than three fourths of the group were between 20 years and 44 years of age; only 7 per cent were 55 years of age or over. The median age for all heads of households was 33.5 years [page 56].

10. The usual occupation prior to migration for the majority of the heads of the households was farm labor. Of those reporting usual occupation as "farmer," 67.8 per cent were farm laborers, 17.7 per cent tenants, 10.8 per cent share croppers and 3.7 per cent owners. Of those reporting as nonagricultural workers, 33.7 per cent were unskilled manual laborers, 27.8 per cent semiskilled, 19.7 per cent skilled workers, 10.6 per cent servants and 8.2 per cent all others [pages 59-63].

11. The migrant heads worked an average (median) of six months during 1937. The work was usually in agriculture. Although 66 per cent enjoyed six months or more of work, only 34.7 per cent enjoyed eight months or more of work, and less than 24 per cent were employed nine months or more [pages 64-67].

12. The greater number of the migrant households were living in three California counties, Kern, Fresno and Tulare, at the time they received the earliest Farm Security Administration grant. These are agricultural counties with high seasonal labor requirements [page 68].[8]

Thus there continues to be a westward flow of population composed predominantly of native white men and women in the prime of life; as far as age mobility and the disappointments which often come at the end of the migration are concerned, this might be a return of the classic picture of pioneer days. There must be added to this picture the migrant's needs for the necessities of life and the rigidity of state laws and regulations and county requirements imposed on nonresidents who apply for material assistance.

These thousands of migrants with their families and their meager belongings created a new and acute problem for the West. Having little more than a hope of finding work, and some sort of motor transportation to move from the present job to the next uncertain job, most of these migrants could scarcely ever look forward with confidence in their own unaided ability to provide even the necessities of life. Housing and sanitation were (and still are) in some places extremely uncivilized. Faulty nutrition, worry, disappointments, homesickness, fatigue, exposure, long hours at work and almost unbelievable sanitary conditions must have added something to at least a portion of their medical needs. Although it was found later that some of these people were suffering from health impairments of long standing, many of them must have had an abundance of natural resistance not to succumb to unfavorable conditions.

It matters little at the moment whether these people are victims of circumstance or whether they chose the life they are now compelled to live; they are human beings with needs similar to those of the stabilized population; their plight may be due in some measure to present day social, economic and industrial trends.

It is beyond the scope of this review to discuss methods for the stabilization of this group. More data are needed, particularly on the available numbers of qualified workers classified as to tasks, localities, the part that industries can play in taking up the slack in agricultural employment, the part which the state may and should take in providing employment during the slack seasons in agriculture and the manner in which seasonal agricultural workers may be given an opportunity to market their services over longer periods in order to increase their yearly incomes.[9]

It is believed, however, that as far as individuals or families in this migrant population are indigent and although possibly employable are unable to become self supporting, their care is a community responsibility to be supported from public funds.

### PLANNING AND ORGANIZATION OF THE MEDICAL PROGRAM IN CALIFORNIA

The severe floods of the winter of 1937 and 1938 aroused Californians to the tragedy of the many Dust Bowl and migrant families who had entered the state in large numbers since 1934.

The Federal Transient Program ended in 1935. Relief activities were then turned over to the State Relief Administration, which immediately established a policy of denying aid to the nonresident applicants who refused to consider return to their native states. The agricultural migrants, when asked to agree to return, answered "Why go back? We have no home."

The relief situation among migrants soon reached disastrous proportions. Since local aid was sporadic and utterly inadequate, these conditions influenced the Farm Security Administration, formerly the Resettlement Administration, to adopt an emergency relief policy of making grants in cash and commodities to these hard-pressed migrant families.

During the winter of 1937-1938 serious illness and malnutrition among migrants were reported to the Regional Office of the Farm Security Administration. These reports even expressed a fear of the possibility of epidemics among the migrant agricultural workers.

The Farm Security Administration endeavored to prepare, in cooperation with the State Relief Administration, a program for administering federal aid to agricultural transients. The plan was not successful and the Regional Office of the Farm Security Administration then decided to make the relief furnished to transients through its facilities include medical care as well as food.

There were difficulties in assuring payment for medical care through the use of grants to highly mobile individual families who might leave the vicinity before the grant check was delivered. Accordingly, some method of direct payment seemed necessary to make the program workable.

Prior to the adoption of a definite medical program, the directors of the State Department of Public Health and the Public Health Service and representatives of the California Medical Association were consulted. An outline of the proposed plan was presented to the California Medical Association which officially approved it in principle and later called a meeting at which the proposed program was explained to representatives of the county medical societies in the areas in which medical services were to be provided.

### ESTABLISHMENT OF THE AGRICULTURAL WORKERS HEALTH AND MEDICAL ASSOCIATION AS A CORPORATION

Articles of incorporation and by-laws, prepared by the legal department of the Farm Security Administration, approved in Washington and filed with the California secretary of state, created an association to be known as the Agricultural Workers Health and Medical Association. The association, although incorporated in California, was given legal authority to do business in

8. A Study of 6,655 Migrant Households in California, pp. 7-10.

9. Adams, R. L.: Seasonal Labor Requirements for California Crops, Berkeley, Calif., University of California, 1938, p. 27.

other states. This was done for the purpose of permitting the extension of a medical aid program into Arizona without necessitating the creation of another corporation.

The articles of incorporation provided for a nonprofit association for the purpose of mutual benefit and further rehabilitation of its members. The association was empowered to engage in any activities involved in or related to the provision of medical and dental services, nursing or hospitalization, medical and surgical supplies and appliances and such other services and supplies as might be incident to the convenience and preservation of the health of its members.

The articles of incorporation empowered the association to borrow from the Farm Security Administration of the United States Department of Agriculture or from any other federal or state agencies moneys, goods or services necessary or convenient to the accomplishment of the objectives of this association.

Principal offices for the transaction of business for this asociation were to be established in Fresno County, Calif., but the association was given authority to maintain offices and places of business in such other localities within or without the state of California as the board of directors might determine.

The by-laws of the association provided that only low-income farm owners, farm tenants, share croppers, farm laborers, drouth refugees or persons who, when last employed, obtained a major portion of their livelihood from agricultural or other types of farming operation should be admitted to membership.

The control of the association was to be vested in a board of directors consisting of seven members. Four of the board members were to be designated by the administrator of the Farm Security Administration of the Department of Agriculture; one was to be a physician designated by the California State Department of Public Health; two were to be physicians designated by the president of the California Medical Association.

The plan of operation for furnishing medical assistance to agricultural workers by the Agricultural Workers Health and Medical Association states:

TITLE I

*Purpose of the Agricultural Workers Health and Medical Association.*—The association will engage in providing medical and dental care to migratory agricultural workers for whom local, county and state medical facilities are not available due to local residence regulations.

TITLE II

1. *Membership.*—The Agricultural Workers Health and Medical Association will receive applicants for membership in the association by referral from representatives of the state department of public health and from representatives of local relief and health agencies. The applicants will be interviewed and investigated by medical social workers employed by the association to determine their status as low-income agricultural workers and their inability to obtain medical assistance from county welfare or other agencies, because of residence requirements or lack of funds. The application form for membership is attached.

The client agrees in the application for membership that he is obligated to repay the association for such moneys expended by the association in paying bills incurred by him, his immediate family or dependents, for emergency medical and dental treatment, services and supplies.

2. *Procedure for Receiving Medical and Dental Care.*—Upon acceptance of the client's application for membership in the association, he will be issued a membership certificate privileging him to obtain emergency medical and dental treatment, services and supplies, subject to and as defined by the by-laws and other regulations of the association.

The member will be referred to doctors of medicine holding unrevoked licenses to practice in the state of California, eligible to membership in the county medical societies and who have agreed to participate in the program, or dentists holding unrevoked licenses to practice in the state of California. A referral will be signed by the medical social worker. This referral will serve as authorization for one visit by the physician. Upon examination at the time of the first visit, the doctor will recommend the necessary treatment to the client upon a form provided entitled "Authorization and Invoice for Medical and Dental Services or Supplies." This authorization, when approved by the medical social worker and signed by the client, will serve as an authorization for subsequent treatment not to exceed ten visits or two weeks.

The authorized services will include drugs and special diet requirements prescribed by the physician, hospitalization where necessary, x-ray and laboratory services, and emergency dental extractions and treatment.

Medical assistance may be obtained by members of the association on presentation of their membership certificates at any of the district offices of the association.

Following the extension of medical service to the member, the doctor, hospital or druggist will present copy of the authorization and invoice to the association for payment. There are attached detailed instructions entitled "District Office Procedure" for carrying out the above-mentioned procedure. . . .

TITLE V

*Modifications of Plan of Operation.*—Modifications of this plan of operation shall be made only with the approval of the board of directors of the association.

THE OPENING OF DISTRICT OFFICES AND ESTABLISHMENT OF LISTS

The state of California was divided into districts with regional headquarters in Fresno. A district office for district 1 was established in Fresno on May 4, 1938.

During the month of May 1938 six district offices were set up and located in Fresno, Merced, Stockton, Tulare, Madera and Marysville.

The general manager, in selecting personnel for the medical-social division of the program, cooperated with the state department of public health, which assisted him in interviewing and selecting suitably trained medical-social workers.

Before the program was put into operation in California, all physicians, druggists and private hospitals were advised of the scope and objectives of the program. Physicians, druggists and hospitals were given details of the fee schedules to be used, and those who desired to participate in the program were listed to give service in each respective district.

Although the California Medical Association had approved the program in principle, there was some reluctance on the part of the physicians in most localities to be placed on the association's list of physicians. This hesitancy was due chiefly to a general fear of any new type of government controlled medical program. A number of physicians expressed some unwillingness to have these agricultural workers as patients in their waiting rooms. However, within a comparatively short time this feeling was overcome and in every locality the majority of the physicians asked to have their names placed on the association list.

Dentists were not immediately included in the program, although some dental work was done from the inception of the association through the cooperation of various dentists. In August 1938 names of dentists were added, at their request, to the list of the association's services.

Since the beginning of the program on May 4, 1938, ten districts have been opened in California, extending

south to the Imperial Valley and north as far as Willows, Marysville and Santa Rosa. The coast regions have been serviced out of the San Jose office.

The mobility of the migrant population forces the personnel of these district offices literally to follow the crops. The need in some vicinities is for only a short period of time; the height of a harvest season may require 3,000 agricultural laborers one week and a bare dozen the next. When the peak passes, the office personnel may move on fifty or a hundred miles to a new scene.

In some counties in California there has been a continuous need for permanent offices the year round. For example, Fresno County has maintained permanent quarters since the beginning of the program. Of the total funds expended, 18.2 per cent were spent in Fresno County from May 4, 1938, to May 31, 1939.

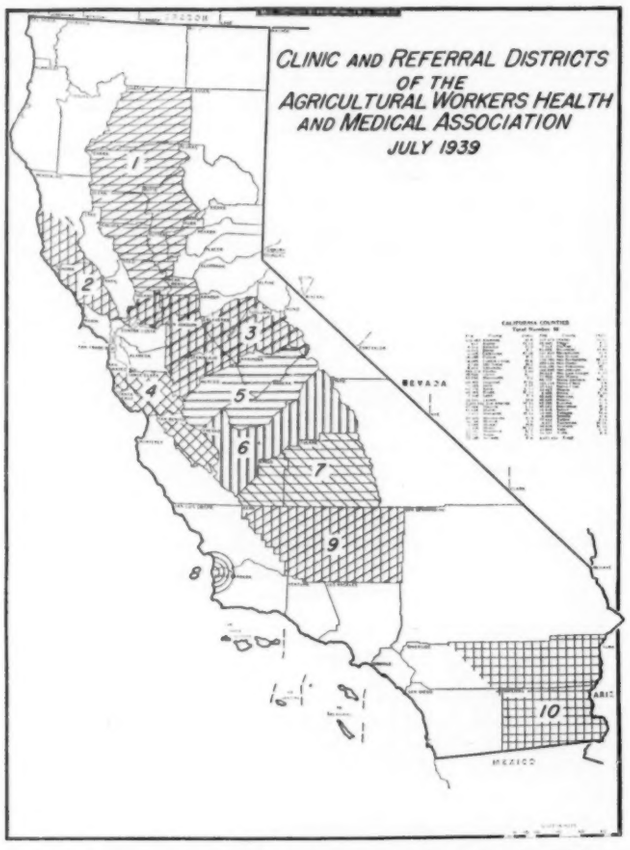


Fig. 3.—The areas comprised within the several districts in California in which the Agricultural Workers Health and Medical Association provides medical care to migrant workers and their families. The counties and types of services in these counties are:

1. *Marysville District—Headquarters: Marysville*

| County | Location | Service |
|---|---|---|
| Butte | Gridley Labor Camp | Referral |
| Shasta | Redding | Referral |
| Glenn | Red Bluff | Referral |
| Colusa | Colusa | Referral |
| Yuba | Marysville Labor Camp | Referral |
| Sutter | Yuba City | Referral |
| Yolo | Winters Labor Camp | Referral |
| North Sacramento | Roseville | Referral |

2, 4 and 8. *San Jose District—Headquarters: San Jose*

| | | |
|---|---|---|
| Santa Clara | San Jose | Referral |
| Sonoma | Santa Rosa | Referral |
| Mendocino | Santa Rosa | Referral |
| San Mateo | San Jose | Referral |
| Santa Cruz | San Jose | Referral |
| San Benito | Hollister | Referral |
| San Louis Obispo | San Luis | Referral |
| Santa Barbara | San Luis | Referral |

3. *Stockton District—Headquarters: Stockton*

| | | |
|---|---|---|
| Solano | Fairfield | Referral |
| South Sacramento | Sacramento | Referral |
| San Joaquin | Stockton | Referral |
| Calaveras | Stockton | Referral |
| Tuolomne | Stockton | Referral |
| Stanislaus | Modesto | Referral |

5. *Chowchilla District—Headquarters: Chowchilla*

| | | |
|---|---|---|
| Merced | Merced | Referral |
| Mariposa | Merced | Referral |
| Madera | Chowchilla | Referral |

6. *Fresno District—Headquarters: Fresno*

| | | |
|---|---|---|
| Fresno | Fresno | Referral |

7. *Tulare-Kings District—Headquarters: Farmersville Labor Camp*

| | | |
|---|---|---|
| Tulare | Farmersville | Clinic |
| Kings | Hanford | Referral |

9. *Kern District—Headquarters: Bakersfield*

| | | |
|---|---|---|
| Kern | Arvin | Clinic |
| Kern | Shafter | Clinic |

10. *Riverside-Imperial District—Headquarters: Indio Labor Camp*

| | | |
|---|---|---|
| Riverside | Indio Labor Camp | Clinic |
| Riverside | Beaumont Labor Camp | Clinic |
| Imperial | Calipatria Labor Camp | Clinic |
| Imperial | Brawley Labor Camp | Clinic |

### EXTENSION OF MEDICAL ACTIVITIES TO ARIZONA

During the latter part of September 1938 the association's program was extended to the state of Arizona. A branch regional office was established at Tempe, Ariz., and six district offices were established in the towns of Buckeye, Phoenix, Avondale, Coolidge, Chandler and Yuma.

From the beginning, the district offices in Arizona were operated as diagnostic and treatment centers rather than referral offices and were staffed with nurses instead of medical-social workers.

### THE ESTABLISHMENT OF THE DIAGNOSTIC AND TREATMENT CENTER TYPE OFFICE IN CALIFORNIA

The use of diagnostic and treatment centers under the direction of nurses proved satisfactory in Arizona and it was determined to convert the referral type offices in California to the diagnostic and treatment center type. Existing clinics had already been built in the Farm Security Administration labor camps in Brawley, Shafter, Arvin and Farmersville. The Farm Security Administration turned over to the association these clinics, together with all equipment. The association then provided additional equipment as needed and a full supply of drugs to be used and dispensed in the clinics. The nurses in charge are able to do minor dressings at their own discretion, and doctors chosen by the county medical society serve each morning in the diagnostic and treatment centers. They care for those types of minor ailments which can be easily handled in the clinic. A list of physicians for referral purposes is still maintained for patients needing service beyond the scope of the clinic.

### THE NUMBER OF PERSONS SERVED, CARED FOR, AS OF MAY 31, 1939, AND THE NUMBER OF PHYSICIANS, DENTISTS, HOSPITALS AND DRUGGISTS RENDERING SERVICE

The number of migratory workers and members of their families served from the inception of the program, both in California and in Arizona, are given in table 1.

The total amount of money expended since the inception of the program in May 1938, including the commitments through May 31, 1939, is $952,597.97, of which $754,238.70 was expended in California and $198,359.27 was expended in Arizona.

During the period of operation until May 31, 1939, there has been a total of 900 physicians serving the association members, 750 of whom are in California and 150 in Arizona. Approximately 150 dentists serve the association, 100 of whom are in California and fifty in Arizona. A total of 150 hospitals have been used by the association members, 100 of which are in California and fifty in Arizona. Eight hundred and eighty druggists are on the panel of the association, 700 of whom are in California and 180 in Arizona.

The price schedule adopted for the druggists was similar to that already in operation by the State Relief Administration. This schedule was found not to be entirely satisfactory and in July 1938 a new schedule and agreement was submitted to the secretary of the California Retail Drug Association. The new schedule was approved by the secretary of the California Retail Drug Association and was put into use about the first of August 1938.

TABLE 1.—*Families and Persons Served*

| | California | Arizona | Total |
|---|---|---|---|
| Families from May 4, 1938.. | 8,067 | 3,154 | 11,221 |
| Persons from May 4, 1938... | 16,413 | 6,230 | 22,643 |
| Members from May 4, 1939.. | 8,173 | 3,328 | 11,501 |

Almost all of the druggists in all districts agreed to serve the association members.

GENERAL SCOPE OF OPERATION

A medical adviser was appointed in October 1938 with instructions to prepare standards of service to apply to acute and emergency needs only.

A new fee schedule was revised and made effective in March 1939 for both California and Arizona. The fees now set are less than compensation fees, since compensation fees are based on active industry and employment, with a profit factor in the insurance program, but an effort has been made to keep the fees for medical services to migrant workers consistent with good medical care.

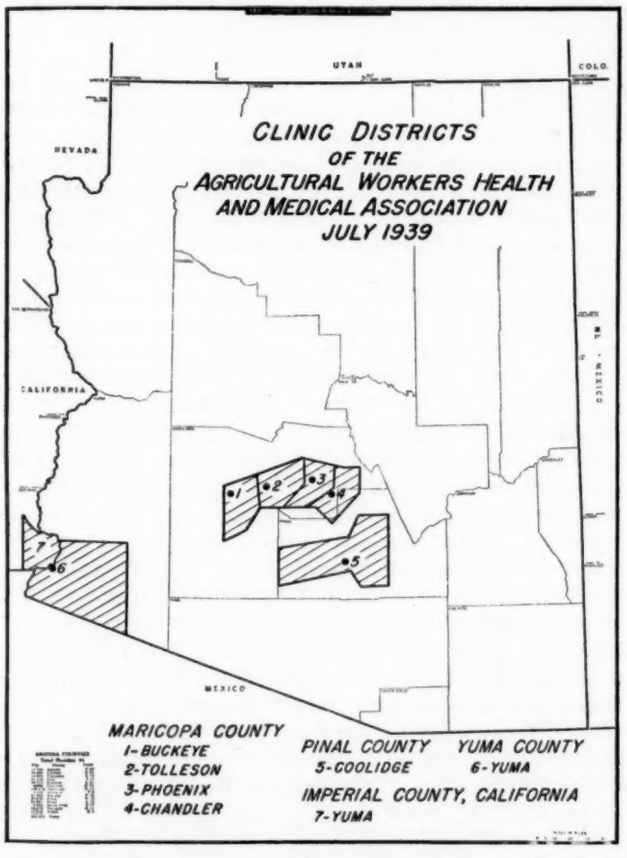


Fig. 4.—The areas comprised within the clinic districts in Arizona in which the Agricultural Workers Health and Medical Association provides medical services to migrant workers and their families.

Problems of medical administration began to appear, and with accumulated experience it became apparent that definite controls had to be established. A short history form was made, so that unusual service demands might be referred to the medical adviser and kept under his control.

Early in the program it became obvious that chronic diseases such as nutritional disorders, glandular deficiencies, degenerative diseases and chronic infections were creating excessive demands for services. Many of these chronic conditions were becoming disabling, rendering the man unemployable or making it impossible for the mother to care for her family. An attempt was made to expand the program enough to relieve these conditions and to care for some of the chronic diseases of childhood.

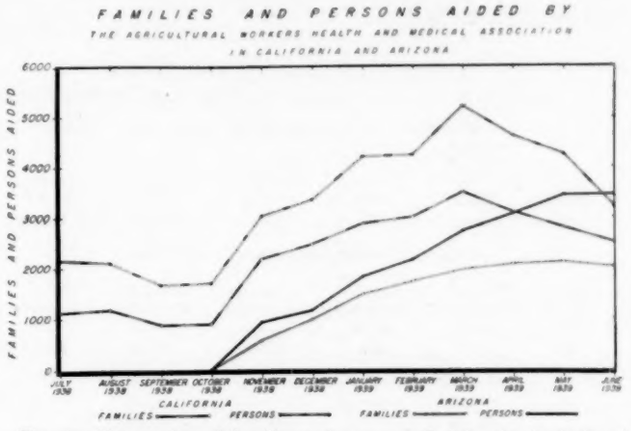


Fig. 5.—The number of families and persons aided by the Agricultural Workers Health and Medical Associatoin in California and in Arizona by months from July 1938 to June 1939.

The association's records show that a wide variety of services have been rendered to migrant workers. This care has ranged from the management of communicable diseases to the treatment of complicated illnesses requiring major surgery. Malnutrition and dietary deficiencies have been fairly prominent among children, but the largest volume of medical care for all ages has pertained to the digestive and respiratory systems. Infections and injuries have also required considerable attention. For the year May 2, 1938, to June 30, 1939, care was given in 1,688 obstetric cases. The membership of the association as of June 30, 1939, was 12,266. Since this membership fluctuated during the year, it is impossible to state from the available information the exact birth rate among these families.

TABLE 2.—*Services by Age*

| Age 0-6 | | Age 6-18 | | Age 18 and Over | |
|---|---|---|---|---|---|
| Treated | Hospitalized | Treated | Hospitalized | Treated | Hospitalized |
| 5,548 | 966 | 6,726 | 1,506 | 18,913 | 4,215 |

| Total | |
|---|---|
| Treated | Hospitalized |
| 31,187 | 6,687 |

In the opinion of those who are constantly in touch with the demand and supply of medical services to migrant agricultural workers in California and Arizona, the members of the Agricultural Workers Health and Medical Association are receiving medical care which is in all cases equal, and sometimes superior, to that which they would be able to obtain as private patients acting as their own contractors for the services needed. Although the association limits the services which it provides chiefly to the field of emergency medical care, it has frequently been found to be economically sound

to provide medical and surgical care for chronic conditions outside the strictly emergency category. This policy is explained on the ground that the relief of many chronic conditions has lifted heads of families from the unemployable to the employable class, thus enabling them to provide for their families, who otherwise would remain public charges.

TABLE 3.—*Amount and Cost of Service*

Fractures* (Nine Districts in California)

| No. of Cases | Total No. of Physicians' Visits | Average No. of Visits per Case | Average Physicians' Cost | Average Hospital Cost | Average Cost |
|---|---|---|---|---|---|
| 54 | 338 | 6.3 | $13.58 | $51.05 | $64.63 |

Obstetrics* (Nine Districts in California)

| No. of Cases | Total No. of Physicians' Visits | Average No. of Visits per Case | Average Physicians' Cost | Average Hospital Cost | Average Cost |
|---|---|---|---|---|---|
| 127 | 830 | 6.5 | $20.48 | $37.80 | $58.28 |

Tonsillectomies* (Nine Districts in California)

| No. of Cases | Total No. of Physicians' Visits | Average No. of Visits per Case | Average Physicians' Cost | Average Hospital Cost | Average Cost |
|---|---|---|---|---|---|
| 101 | 415 | 4.1 | $23.87 | $16.66 | $40.53 |

Itemization of Charges

| Physician | | Hospital | |
|---|---|---|---|
| Surgery | $15.00 | Operating room | $ 5.00 |
| 4.1 visits per case | 5.75 | Anesthetic | 3.00 |
| Incidentals | 3.12 | Ward care (1 day) | 3.75 |
| | | Incidentals | 4.91 |
| | $23.87 | | $16.66 |

Appendectomies* (Nine Districts in California)

| No. of Cases | Total No. of Physicians' Visits | Average No. of Visits per Case | Average Physicians' Cost | Average Hospital Cost | Average Cost |
|---|---|---|---|---|---|
| 50 | 712 | 14.2 | $73.91 | $70.43 | $144.34 |

Itemization of Charges

| Physician | | Hospital | |
|---|---|---|---|
| Surgery | $50.00 | Operating room | $15.00 |
| 14.2 visits per case | 18.50 | Anesthetic | 6.00 |
| Incidentals | 5.41 | Assistant | 12.50 |
| | | Ward care (8 days) | 30.00 |
| | | Medications | 6.93 |
| | $73.91 | | $70.43 |

Prescriptions Issued to Families and Individuals
(Ten Districts in California)

| Number Issued | Number Families | Number Persons | Average per Family | Average per Person |
|---|---|---|---|---|
| 2,409 | 871 | 1,661 | 2.7 | 1.4 |

Average Cost of Prescriptions
(Ten Districts in California)

| Number of Prescriptions | Total Cost | Average Cost |
|---|---|---|
| 2,409 | $2,822.32 | $1.17 |

* These tabulations are actual, as they were compiled from paid invoices.

The association's records afford some interesting and valuable data pertaining to the medical services that have been provided.

From May 2, 1938, to July 31, 1939, the Agricultural Workers Health and Medical Association provided services to nearly 38,000 migrant workers and their families. The distribution by age and services, as recorded in the diagnostic report for July 1939, is given in table 2.

A few of the statistics pertaining to the quantity and costs of services are available.

During September 1936 the amount and cost of services rendered to the association members for certain medical needs are as given in table 3.

The Agricultural Workers Health and Medical Association has used two methods of distributing medical services to its members. In California the migratory workers and members of their families who apply for medical care are referred, for the most part, to physicians who have indicated their willingness to participate in the association's program. Recently the association has changed its policy with respect to the method of providing medical services, and there is now an increasing trend toward clinic service rendered in clinics established at the several district offices, supplemented where necessary by referrals to physicians in their private offices.

In Arizona the largest part of the medical services have been rendered, from the beginning of the program, in clinics established at the headquarters of the several districts. In some instances it is necessary to request physicians to visit workers or members of their families at their places of abode. It is the policy of the association to limit the salaried physicians who serve at the clinics to the clinic care of ambulatory patients. Whenever home calls or hospital care is needed, such patients are referred to physicians not on the clinic service.

It is reported by physicians in Arizona and the administrative staff of the association that the Arizona method of distributing medical services has been satisfactory.

The seemingly satisfactory clinic arrangements in Arizona probably account for a changing policy in California from the referral to a clinic basis. It is reported that the county medical societies in the areas in which services to the association's members are required have indicated a preference for clinics instead of referrals to physicians' offices.

Good medical care for ambulatory patients is possible under either clinic or private office conditions, provided necessary facilities are available and requirements are not imposed in a clinic that would modify the procedures and judgments customary to a physician's private office. Any system of medical care financed by tax funds is likely to be accompanied by rules, regulations, restrictions and procedures that tend to influence professional judgment and hence the quality of medical care. For example, if the salaried nurses and social workers are permitted or directed to indicate to physicians the length of time they are to devote to the diagnosis or treatment of patients' illnesses, the accuracy and completeness of the physicians' services may be modified to conform to the regulations. Physicians who resist such attempts to direct their practice may soon fall into disfavor, notwithstanding the fact that it is the patient who suffers from such regulatory procedures. If all medical care is forced into a mechanical assembly line technic of a minimum number of persons that must be served in a unit of time, the result will be a deterioration of the quality of the service. Physicians should not be compelled to serve under pressure or surveillance by a corporation which prevents them from utilizing their best efforts in behalf of their patients. Moreover, the clinic method of distributing medical services may tend to encourage the use of medical or surgical procedures which actually require hospital facilities.

The payment for good medical services cannot be based solely on time or quantity standards. The skill of the physician and the results obtained are important factors to the patients who look to their association for quality as well as quantity in the protection or restoration of their health.

The clinic, as compared with the private office method of distributing medical care, creates difficulties in the care of those patients who are unable to come to the clinic. Clinic records are usually not available to the physician who makes a home call, unless the clinic physician renders the home as well as the clinic service.

The Agricultural Workers Health and Medical Association has been liberal in meeting requirements for special articles of diet prescribed by physicians, but no satisfactory method has yet been found to handle prepared infant feeding formulas during hot weather. The conditions under which hundreds of these families live makes refrigeration for each family impracticable, and no central refrigeration system for all the families in the numerous groups or camps seems to have been developed.

Environmental and domiciliary conditions present wide variations. Some families exist near the roadside with only a tattered tent for a shelter. Irrigation ditches in some instances may be the source of water for drinking and cooking; these ditches may also carry away sewage and are used sometimes for bathing purposes. Contrasted with these conditions are a number of camps in which electric lights, modern water and sewerage systems, bath houses, laundries, recreation halls and small wood or steel houses have been installed.

The association is developing a mobile unit of service facilities consisting of an administrative office, a medical office, a power unit for electricity and hot water, a bath house and a supply unit. These units are specially constructed trailers that can be moved to any migrant concentration in lieu of similar permanent installations. This development is in the experimental stage and is therefore undergoing considerable modification as a result of actual experience.

Aside from their strictly medical needs, this migrant population presents problems in public health and education vastly different from those of the stabile residents. Since these families are moving frequently, communicable diseases may be easily spread from one to another section of the state. Children of the migrant families are unable to attend public schools continuously for more than a few weeks in any one place.

The director of public health in California has made an effort to extend to the migrant population many of the facilities for health protection that are available to the stabile residents of the state. The State Department of Education has provided educational facilities that move with the groups of migrants as they follow the crops.

Reports from responsible sources indicate that the migrant population in the West is to a high degree law abiding and desirous of becoming self supporting.

The officers of the Agricultural Workers Health and Medical Association recognize that the plan adopted for its members is something of an experiment. Many changes have been made in the manual of procedures, and conferences to discuss policies and procedures are held with the professional groups in the several districts. The board of directors and the administrative officers have endeavored to confine their activities to fiscal policies and to place responsibility for the conduct of medical services on the medical and dental professions. A fairly generous amount of funds has been made available by the Farm Security Administration for the association's medical program. Time will demonstrate the practicability of this type of medical relief and the changes that may be needed to maintain and advance the quality of medical and health protection for the migrant group of the general population.

## APPENDIX 1

## ARTICLES OF INCORPORATION OF AGRICULTURAL WORKERS HEALTH AND MEDICAL ASSOCIATION

**(A Non-Profit Corporation)**

KNOW ALL MEN BY THESE PRESENTS:

That we, the undersigned, have this day voluntarily associated ourselves together for the purpose of forming a non-profit corporation, pursuant to Article I, Title 12, Part 4, Division First, the Civil Code of California.

### ARTICLE I

The name of this Association shall be the AGRICULTURAL WORKERS HEALTH AND MEDICAL ASSOOCIATION.

### ARTICLE II

This Association does not contemplate pecuniary gain or profit to the members thereof, and is organized and exists as a non-profit cooperative association without capital stock, pursuant to the laws of the State of California, and the objects and purposes for which it is formed are:

(1) To associate its members together for their mutual benefit and to further the rehabilitation of said members, and to maintain and safeguard the health of its members, and to that end to engage in any activity involving or relating to the obtaining for its members of medical and dental treatment and services and any surgery, nursing or hospitalization, and medical and surgical supplies and appliances, and such other services and supplies as may be incident, necessary or convenient to the preservation and protection of the health of the members of this Association.

(2) To borrow from the Farm Security Administration of the United States Department of Agriculture or any Federal or State agency and from any other source or sources, money, goods or services necessary or convenient to the accomplishment of the purposes of this Association, and to draw, make, accept, endorse, execute and issue promissory notes, drafts, bills of exchange, warrants, bonds, debentures and other negotiable and non-negotiable instruments and evidences of indebtedness, and to secure the payment of any thereof and the interest thereon by a mortgage on, pledge, conveyance or assignment in trust of the whole or any part of the property of this Association, and to make loans, and to make provision for the payment of and to pay bills for services rendered and supplies furnished to its members by physicians and dentists duly licensed to practice medicine or dentistry in the State of California or in such other states in which this Association shall qualify to do business, or by other individuals or corporations rendering services to or supplying property to its members, such provision for payment to be made upon the terms and conditions set forth in the "By-Laws," and to take from members notes or other evidences of indebtedness for services rendered or supplies furnished to them.

(3) To act as the agent or representative of any member in any of the above mentioned activities.

(4) To acquire, hold, own and exercise all right of ownership in, and to sell, transfer or pledge shares of the capital stock or bonds, or become a member or stockholder of any corporation or association.

(5) To lease, acquire by gift or bequest, buy, hold, own and exercise all privileges of ownership over such real or personal property as may be necessary or convenient for the conduct and operation of any of the business of this Association, and to cooperate with any public or private agencies whatsoever in the purchase, construction, equipment, operation, maintenance and supervision of any undertaking of this Association designed to effectuate any of the purposes herein set forth.

(6) To establish reserves and to invest the funds thereof in stocks and bonds of any corporation or in such other property as the Board of Directors may deem satisfactory.

(7) To levy assessments in the manner and in the amount as may be provided in the "By-Laws" of this Association.

(8) To do each and every thing necessary, suitable or proper for the accomplishment of any of the purposes or the attainment of any one or more of the objects herein

enumerated and conducive to or expedient for the interest or benefit of the Association, and contract accordingly; and in addition, exercise and possess all powers, rights and privileges necessary or incidental to the objects and purposes for which the Association is organized or to the activities in which it is engaged; and, in addition, to possess the powers, rights and privileges of corporations organized under the general laws of the State of California, except such as are inconsistent with the express provisions of Article I, Title 12, Part 4, Division First, the Civil Code of California.

### ARTICLE III

The principal office for the transaction of business for this Association shall be in Fresno County, State of California, but the Association may maintain offices and places of business in such other places within or without the State of California as the Board of Directors may determine.

### ARTICLE IV

The existence of this Association is to be perpetual.

### ARTICLE V

The private property of the members of this Association shall not be subject to the payment of corporate debts.

### ARTICLE VI

Upon dissolution, the property of this Association shall be distributed as provided in the By-Laws.

### ARTICLE VII

**Section 1.** The persons signing these Articles of Incorporation shall be deemed members of the Association immediately upon the completion of its organization, but shall not be entitled to receive any of the benefits of membership in this Association, and provided further, that the members of the Board of Directors and such other persons as may be designated by the Administrator of the Farm Security Administration of the United States Department of Agriculture to perform administrative and supervisory functions in accordance with the provisions of the "By-Laws" or otherwise may be admitted to membership without meeting the membership qualifications hereinafter set forth, but shall not be entitled to receive any of the membership benefits in this Association.

**Section 2.** Pursuant to the terms and conditions prescribed in the "By-Laws," this Association shall admit as members only such persons as are low income farm owners, farm tenants, share-croppers, farm laborers, drought refugees, or persons who, when last employed, obtained a major portion of their livelihood from agricultural, horticultural, vitacultural, forestry, dairy, livestock, poultry, bee or farm operations.

**Section 3.** New members may be admitted to membership in this Association under the terms and conditions prescribed in its "By-Laws" and upon their admission to this Association shall be entitled to vote and to share in the property of the Association equally with old members. Membership in this Association shall be evidenced by a "Certificate of Membership," the form, terms and conditions of which shall be as provided for in the "By-Laws." Such "Certificates of Membership" shall not be assignable or transferable except as may be expressly provided in the "By-Laws." Each member shall be entitled to but one vote and there shall be no voting by proxy.

**Section 4.** Assessments against members shall be as fixed in the "By-Laws" of the Association.

### ARTICLE VIII

The names and addresses of the persons who are to act in the capacity of Directors until their successors are elected are:

| NAME | ADDRESS |
|---|---|
| KARL L. SCHAUPP, M.D. | 490 Post St., San Francisco |
| W. R. P. CLARK, M.D. | State Bldg., San Francisco |
| ALBERT E. LARSEN, M.D. | Russ Bldg., San Francisco |
| JONATHAN GARST | 85 Second St., San Francisco |
| OMER MILLS | 85 Second St., San Francisco |
| ROBERT J. GRAVES | 85 Second St., San Francisco |
| RALPH W. HOLLENBERG | 85 Second St., San Francisco |

The number of persons named above shall constitute the number of Directors of the Association until changed by an amendment of the "By-Laws" increasing or decreasing the number of Directors as desired.

### ARTICLE IX

This Association reserves the right to amend or change or repeal any provisions contained in these Articles of Incorporation in the manner now or hereafter prescribed by statute, and all rights conferred upon the members herein are granted subject to this reservation.

### ARTICLE X

The "By-Laws" of this Association shall be adopted by the Directors named in the Articles of Incorporation and may thereafter be amended or repealed by any means provided in the "By-Laws."

IN WITNESS WHEREOF, the persons who are to act in the capacity of the first Directors of the Association have hereunto set their hand this 3rd day of March, 1938.

[s] KARL L. SCHAUPP
[s] W. R. P. CLARK
[s] ALBERT E. LARSEN
[s] JONATHAN GARST
[s] OMER MILLS
[s] ROBERT J. GRAVES
[s] RALPH W. HOLLENBERG

STATE OF CALIFORNIA }
City and County of San Francisco } ss

On this 3rd day of March, 1938, before me, Marguerite G. de Neuf, a Notary Public in and for the City and County of San Francisco, State of California, personally appeared Karl L. Schaupp, M.D., W. R. P. Clark, M.D., Albert E. Larsen, M.D., Jonathan Garst, Omer Mills, Robert J. Graves and Ralph W. Hollenberg, known to me to be the persons whose names are subscribed to the within instrument and acknowledged that they executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate first above written.

MARGUERITE G. DE NEUF
Notary Public in and for the City and County of San Francisco, State of California.

My commission expires: October 24, 1940.

## APPENDIX 2

## CALIFORNIA AND ARIZONA DIAGNOSTIC REPORT, MAY 2, 1938, TO JUNE 30, 1939

| | Age 0-6 | | Age 6-18 | | Age 18 and Over | | Total | |
|---|---|---|---|---|---|---|---|---|
| Diagnosis | Treated | Hospitalized | Treated | Hospitalized | Treated | Hospitalized | Treated | Hospitalized |
| Malformation | 27 | 2 | 11 | .. | 18 | .. | 56 | 2 |
| Allergy | 17 | .. | 35 | 4 | 59 | 3 | 111 | 7 |
| Blood diseases | 12 | 3 | 38 | 1 | 134 | 4 | 184 | 8 |
| Bones and cartilage diseases | 7 | 2 | 18 | 9 | 61 | 27 | 86 | 38 |
| Bursae | 11 | 3 | 6 | 2 | 8 | 1 | 25 | 6 |
| Circulatory system | 1 | .. | 31 | 2 | 482 | 79 | 514 | 81 |
| Deficiency | 773 | 45 | 426 | 8 | 1,407 | 20 | 2,606 | 73 |
| Digestive | 777 | 114 | 1,102 | 174 | 4,517 | 661 | 6,396 | 949 |
| Ear | 300 | 49 | 179 | 19 | 179 | 18 | 658 | 86 |
| Endocrine and spleen | 11 | 1 | 38 | .. | 122 | 22 | 171 | 23 |
| Eye and adnexa | 182 | 16 | 532 | 22 | 1,135 | 26 | 1,849 | 64 |
| Hernia | 27 | 11 | 32 | 19 | 130 | 63 | 189 | 93 |
| Infections | 513 | 71 | 666 | 87 | 1,421 | 268 | 2,600 | 426 |
| Joints | 2 | 1 | 20 | 3 | 369 | 31 | 391 | 35 |
| Lymph system | 3 | .. | 21 | 5 | 38 | 5 | 62 | 10 |
| Metabolism | 3 | 1 | 12 | 7 | 46 | 10 | 61 | 18 |
| Mental | 1 | .. | 5 | .. | 56 | 4 | 62 | 4 |
| Miscellaneous | 27 | 16 | 34 | 23 | 135 | 76 | 196 | 115 |
| Muscle, fascia and tendon | 18 | 1 | 72 | 4 | 297 | 14 | 387 | 19 |
| Nervous system | 21 | 7 | 59 | 8 | 266 | 18 | 346 | 33 |
| Parasites | 92 | .. | 90 | 1 | 82 | 1 | 264 | 2 |
| Poisoning | 22 | 4 | 13 | 1 | 31 | 11 | 66 | 16 |
| Sex dysfunction | .. | .. | 22 | 2 | 223 | 10 | 245 | 12 |
| Mammary gland | 3 | .. | 4 | 1 | 41 | 13 | 48 | 14 |
| Female reproduction | 2 | .. | 54 | 11 | 939 | 370 | 995 | 381 |
| Male reproduction | 114 | 44 | 48 | 15 | 135 | 27 | 297 | 86 |
| Respiratory | 1,639 | 459 | 1,802 | 751 | 1,919 | 528 | 5,360 | 1,738 |
| Skin, hair and nail | 261 | 6 | 248 | 14 | 484 | 11 | 993 | 31 |
| Urinary organs | 66 | 11 | 102 | 10 | 707 | 141 | 875 | 162 |
| Tumors | 3 | .. | 22 | 9 | 247 | 113 | 272 | 122 |
| Obstetric | .. | .. | 182 | 131 | 1,506 | 1,247 | 1,688 | 1,378 |
| Newborn disease | 31 | 14 | 1 | .. | ... | .. | 32 | 14 |
| Injuries to special organs | 315 | 54 | 542 | 124 | 749 | 218 | 1,606 | 396 |
| Examination only | 60 | .. | 79 | 2 | 241 | 2 | 380 | 4 |
| Totals | 5,341 | 935 | 6,546 | 1,469 | 18,184 | 4,042 | 30,071 | 6,446 |

This table is taken directly from the June 1939 monthly report of the Agricultural Workers Health and Medical Association. It indicates the number of persons who received treatment and who were hospitalized from a total of 23,679 persons given assistance by the association during the fourteen month period ended June 30, 1939. Some of the diagnoses that are listed are not altogether clear, but a complete clarification would require an entire check of the records of the association.

The classification of the diagnoses refers in most instances to anatomic locations or systems and does not give exact pathologic diagnoses.

The chart does, however, give a general index of age incidence within broad age groupings and indicates the number of persons who were hospitalized.

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# ANNUAL CONFERENCE OF SECRETARIES OF CONSTITUENT STATE MEDICAL ASSOCIATIONS

***Held in the American Medical Association Building, Chicago, Nov. 17-18, 1939***

*(Continued from volume 113, page 2430)*

## Address by Nathan B. Van Etten, President-Elect of the American Medical Association

DR. NATHAN B. VAN ETTEN, New York: Based on my own experience and inclination, and an amazing amount of testimony from every part of the country, I believe that the time has arrived when organized medicine must step out from its conservative shell. Its objectives must be interpreted in no uncertain language, not only to its own membership, but to all the American people. The practice of medicine is threatened with national political control. This threat comes not only from amateurs such as those who style themselves doctors of the philosophy of public health, who cannot know medical practice because they have never practiced it, but from health officers holding medical degrees who have either forgotten or never knew real service to sick individuals. Representation of these groups have only recently, before large public meetings, reviled the American Medical Association by accusing it of the crime of hypocrisy because it still desires as much individual service to sick people as is compatible with their best interests—because it still works through its own councils every day for better medicine than the day before and because it honestly desires a fair deal for all American doctors. These speakers declared themselves unreservedly for a complete system of government medicine not only preventive but curative.

The great majority of those who comprise the federation of American Medicine disbelieve in such proposals and will fight for their own objectives, which they believe will conserve the best interests of all our people. The private practice of medicine has such public consequences that government umpiring and government assistance may be necessary, but the practice of medicine by government is most undesirable. Government practice would act in restraint rather than in promotion of incentive or opportunity.

The American people will determine through expression of opinion what kind of medicine they will have. The secretaries and editors must influence that opinion toward what they believe will be the best kind of medicine. People vote for what they believe is best for their pocketbooks. Very few budget for anything except for rent and heat and light. Budgeting for health is rare. Health is a gamble and means little until it is lost. No government regulation will prepare people for the tragedies of sickness any more effectively than regulation within the family unit. It might make them even more careless through the consciousness of a protecting paternalism. There is a concerted drive for general service in sickness supported by taxation, which, of course, involves government control. Something better must be offered which will meet the demand of the ordinary man for medical service which shall be available and within his means.

I believe that any new program for medical service should develop from the periphery toward the center. I believe that all health operations should work from the school district to the township—to the county—to the state—to the federal authority in that order and that federal authority should be used as infrequently as possible. I believe that every local ability to furnish medical care should be explored and should be employed before government aid is requested. I believe that we should develop objective plans along these lines. I believe that we should work for centralization of all federal health agencies except those of the Army and the Navy in one organization such as a National Health Department. I believe that medical care of the economic indigent is the problem of the taxpayer. The economic indigent may be defined as a person who is unable to provide the necessities of life for himself or his family. I believe that the medical care of the medical indigent is the problem of the taxpayer. The medical indigent may be defined as a person who cannot pay for medical care without sacrificing the necessities of life for himself or his family. I believe that the medical care of these members of society should be administered by the medical profession, who should be paid for this work by the taxpayer. I believe that the problems of low income groups who are able to care for ordinary but not for catastrophic sickness should be shared by the medical profession and the taxpayer. I believe that hospital and clinical service facilities should be extended in every direction where they are needed. I believe that serious efforts should be made to remedy the failures of the distribution of medical care to sections of our country where there may be groups of neglected people. I believe that projects for the extension of medical care should be developed no faster than personnel can be trained to make them effective.

You have heard the statement of the Trustees this morning carrying eight objective principles, which had the full authority of the House of Delegates at the St. Louis session. Using these points as basic, I believe that we should try to find an American way to develop the sound objectives of an American health program and I hope that the secretaries and editors of the American Medical Association will promote it to the limits of their ability.

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## MEDICAL SERVICE PLANS OF STATE AND COUNTY MEDICAL SOCIETIES

### Program for Distribution of Medical Care in New Jersey

MR. NORMAN M. SCOTT, New Jersey: A program fitted to New Jersey should, of necessity, consist of two efforts: one a plan for the medically indigent and one a plan for the so-called low wage group. Plans to fit both of these economic classes are in process of preparation in New Jersey and are progressing nicely. Today, we have to do with the low wage group. Is this plan insurance? When the committee started its deliberations it got in touch with the Commission of Banking and Insurance, which was friendly and cooperative. It outlined certain lines of procedure which it thought would help us and which we might follow, and the committee proceeded along those lines.

Last July our legal advisers who attended this meeting advised us that this was not insurance, that we could incorporate under the law allowing for the incorporation of corporations not for pecuniary profit, and that if under that corporation not for pecuniary profit we wished to assist in the distribution of medical care, that was our privilege. We proceeded along that line. We presented the material to the house of delegates last June, and we incorporated as a nonprofit corporation. In August came word from the Commissioner of Banking and Insurance that the interpretation of our effort by the commission was that under state law this was an insurance effort; that if we went into operation the commission would be forced to take action against us to determine in the courts whether it was justified in assuming that position and to force us under the Commission of Insurance and to force us under new enabling

legislation. But our legal advisers still insisted it was not insurance. In the back of our pamphlet I have put in a short digest of the two opinions.

So it went back and forth for two or three months. As matters crystallized, we concluded that we were just a guinea pig to solve an academic problem in which we were not interested. If we wished to solve this problem as to whether we were legally undertaking insurance or not, it would require all the capital funds we had, which had been allotted to us by the state, and would delay us one or two years. It was settled at a special meeting of the board of trustees on November 5. Our legal advisers said we presented it to the house of delegates not as an insurance effort; therefore we were departing from the powers vested in us by the house of delegates. The second question raised by the law was that we were exceeding the powers granted us. The board of trustees then upheld what we had done and granted permission to proceed with any other effort which would speed the accomplishment of this plan.

So we are operating the plan under the jurisdiction of the Commission of Banking and Insurance and discarding the academic question of whether or not it is insurance. It would cost us too much to find out. There are definite advantages in going under the jurisdiction of the Commission of Banking and Insurance. It protects us from rackets which might be troublesome. It protects us against any other organization starting a similar plan in the state.

We prepared two or three tentative drafts of an act. We got it finally in shape and it has gone to our lawyers now. We hope to put it through early in the session of the legislature as a noncontroversial bill allowing for the operation of medical service plans under the jurisdiction of the Commission of Banking and Insurance.

Another question is the fee schedule. In the early months of the development of this plan we spent many weeks discussing fee schedules, collecting fee schedules and trying to make up fee schedules. I do not think that fee schedules have ever been popular in New Jersey. We could find only one from a county medical society and it had pigeonholed it. After long discussion and the examination of many fee schedules we came to the conclusion that this could not be a success and be based on actuarial figures. We could not determine what actuarial figures would apply, and we adopted the philosophy that the services of a physician to a patient were too intangible, too individualistic to be given any fixed monetary value. So from that we evolved the system which we wish to apply with regard to fees in this plan.

In each county in which this plan operates there will be an advisory committee, similar to the plans of all the states. It will be the duty of this committee to review the bills submitted by the physicians. That will not be a tremendous task. We shall have a limited fee schedule, we think now, which allows $1 for an office call and $2 for a house call. Perhaps there will be 10 per cent of the bills for special procedures which the committee will have to review. The amount actually paid the physician will depend on the decision of this committee and the amount of money available in the headquarters. The amount paid the physician will be determined after considering the amount available and the usual price charged that particular type of individual for that particular type of service in that particular locality.

We shall give these advisory councils a skeleton fee schedule to guide them. They know they won't pay $250 for an appendectomy. They might consider, under certain circumstances, they would pay $100, and when it is actually paid they will pay $50; but there will be nothing fixed about it. The physicians participating must agree to abide by the decisions of that committee. I think there is no doubt that in every county there are many men who can be appointed as a group to review these bills in whom the profession has faith and in whom they have sufficient trust that they will accept the decision of the committee on the amount of money which will be paid to them for their services. If we do not have that type of cooperation from the medical profession, and if we cannot depend on the integrity and the cooperation of the medical profession, naturally the plan will fail. Perhaps, after more definite experience, we can put it on a more fixed actuarial basis, but that will be the start, and that, like all other phases of the plan, is purely experimental. While we shall operate on a state charter, the plan will be instituted in one or possibly two counties and then spread as we learn by experience.

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### Michigan Medical Service

DR. L. FERNALD FOSTER, Bay City, Mich.: The Michigan State Medical Society recently gave endorsement to the medical service plan "Michigan Medical Service," which has been developed after nine years of careful study.

Michigan Medical Service is a voluntary nonprofit group medical care corporation organized under special enabling legislation (Act 108 of 1939) passed by the Michigan legislature under the sponsorship of the Michigan State Medical Society. Subscribers to this medical service plan will be entitled to designated medical services from doctors of medicine. The purpose of Michigan Medical Service is to assist residents of Michigan, particularly those in the low income group, to obtain the services of doctors of medicine by providing for medical services in return for small monthly subscription payments.

Almost a decade of surveys and studies by the Michigan State Medical Society at a cost of more than $30,000 has indicated convincingly that the primary problem is the economic inability of certain classes of the population to utilize the medical services and facilities available. Consequently the Michigan State Medical Society recognized the need for some means to assist these persons to make use of necessary medical services.

For an understanding of the plan itself, the following outline indicates the fundamental principles:

*Administration.*—Michigan Medical Service will be administered by a board of directors consisting of from eleven to thirty-five representatives of the public and the medical profession. The articles of incorporation of Michigan Medical Service have already been certified by the attorney general. The Michigan State Medical Society has advanced the necessary working capital. The plan will go into effect in the near future and its operation will be under the direct supervision of the Insurance Department of the State of Michigan.

*Membership Requirements.*—All employed persons under the age of 65 who can be enrolled in groups of twenty-five or more will be eligible for membership. Experience has shown that group enrolment is a definite requisite, at least during the initial period of operation. Subscribers may enroll their dependents, including the husband or wife and children under 21 years of age. An annual income not in excess of $2,000 for individual subscribers and $2,500 for subscribers and their families is tentatively proposed as a membership requirement.

*Benefits.*—Subscribers to Michigan Medical Service and their dependents will be entitled to receive the following benefits: 1. Medical and surgical care from doctors of medicine of their own choice, including home, office and hospital visits. 2. Consultation services and special medical services such as x-ray, laboratory and anesthesia services performed by doctors of medicine. 3. Obstetric services after membership for a period of twelve consecutive months. 4. Medical services necessary to establish a diagnosis for tuberculosis, venereal diseases, cancer and nervous or mental conditions. The subscribers will be entitled in any one subscription year up to $325 worth of medical services for individual subscribers, $550 worth of medical services for husband and wife and $875 worth of medical services for a family.

*Limitations.*—There are as few restrictions as possible. However, it is obvious that some limitations are necessary to bring the cost of the plan within the income of the eligible subscribers. The benefits are limited to services of doctors of medicine only. Conditions which are provided for under special legislation, such as workmen's compensation or which existed prior to the date of membership, are not included.

*Costs.*—The subscription rates proposed for Michigan Medical Service are $2 a month for individual subscribers, $3.50 a month for husband and wife and $4.50 a month for a family. An initial registration fee of $1 will be charged in the first year only to provide for part of the cost of enrolling members. The actuarial basis of this rate structure has been carefully deter-

mined from the basic sources of information previously indicated. Such data give considerable assurance of stability and if a surplus is accumulated it can be used to lower the subscription rate or to increase the benefits. The employer can contribute part of the cost to help the employee obtain the benefits of this plan. For those persons who are destitute or who are in the very low income group—the indigent or medically indigent—special arrangements may be made with governmental agencies or private agencies for the payment of part or all of the subscription cost. This is specifically a provision of the enabling act.

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### Medical Service Bureaus in Washington

DR. V. W. SPICKARD, Seattle, Secretary, Washington State Medical Association: The house of delegates of the Washington State Medical Association in August 1933 approved and endorsed the formation of medical service bureaus within the state. The "whereases" of the resolution which was adopted explain clearly the problems which were confronting the physicians of Washington at that time. I will read part of that resolution:

WHEREAS, This association as an integral part of the American Medical Association has for one of its major objects the continuous raising of the standard of professional ability of those who practice scientific medicine; and

WHEREAS, The raising of such standards is becoming increasingly difficult, not only by reason of the present economic conditions, but because certain schemes have grown up in recent years which are making it difficult for physicians to receive adequate rewards for their services; and

WHEREAS, In contract practice as it has developed within the last few years the young doctor has been finding his practice bottled up and the older practitioner has been finding his practice slipping away to men who are not justified in taking that practice by reason of superior professional ability; and

WHEREAS, Every scheme which divides medical practice except in accord with the professional ability of the physician is inimical to the best interest of the profession and the patient as well; and

WHEREAS, Contract practice is one of such schemes and lends itself to the exploitation of the physician by laymen; now therefore be it

*Resolved*, by the Washington State Medical Association, That we hereby approve and endorse the formation of local medical bureaus within the state of Washington as a proper means of fighting the growth of contract practice and health insurance.

Thus started a movement which has had a profound effect on the practice of medicine in Washington and to a lesser extent in many other states.

Before analyzing the operation of the medical service bureaus, let us look for a moment at the peculiar circumstances in Washington which gave rise to the creation of these bureaus. In the first place, the bulk of industrial activity in Washington is lumbering, fishing and mining. These are relatively hazardous occupations, and the companies normally made a practice of having some physician on hand ready to treat any one who might be injured.

An industrial insurance law was passed in 1917 to make it more certain that the injured worker would receive proper medical care and adequate compensation. There were three methods under this law by which medical care could be made available to the covered employee. One was on the basis of a free choice of physicians paid for by the administrative department from fees collected from the employers and the employees; another was for the company to hire a doctor and to furnish necessary care and hospitalization, and the other method was for the company to contract with some physician or group of physicians to supply this care, the contracting physician providing all necessary drugs, appliances and hospitalization.

Although contract practice had existed in this state prior to the adoption of the industrial insurance act, it received a tremendous impetus under the operation of the act. In communities where the industrial workers constituted the bulk of the practice of the physicians, the competition to secure the contract was intense, often resulting in physicians securing contracts at a figure too low to render adequate care to the covered workers, with a resulting exploitation of such workers. Although under the act the employees are supposed to be permitted to select their contracting doctor by means of ballot, it was charged that often the actual selection rested with the employer, and various means were used to force the employees to accept this choice. It is alleged that some physicians would treat the employers and their families free of charge and rebate part of the contract money to the employer as a means of securing the contract.

While some of these physicians handling industrial contract work extended the contract to include the families of the workers, still the effects of contract practice were not felt with full force until the period of the depression starting in 1929. As industry after industry closed or curtailed operations, the contract doctor began searching for new business. A number of these physicians had established elaborate clinical facilities and some had even built their own hospitals. The contract doctor started going far afield to secure new contracts. Whereas previously this type of practice had been confined chiefly to large industrial units, the employees of small businesses were offered contracts for medical care. Contract physicians in many cases would move into a community, sell most of the population on a prepayment plan and then give the local physician the unhappy alternative of hiring out to the contract group at a low salary or seeing his practice disappear to physicians who would be brought in from the outside. As the depression grew, many doctors who had never previously been interested in contract practice started considering the possibility of organizing contract schemes of their own to meet the vicious competition. By 1932 and 1933 various proposals were being worked out with the insurance companies to blanket the state with a form of health insurance which contemplated offering salaried positions to most of the physicians. This was the background which led up to the adoption of the resolution by the house of delegates in August 1933.

Medical service bureaus had existed in Washington since prewar days. The Pierce County Industrial Medical Bureau, still in existence, was the first to be organized. A similar bureau was in operation in King County, which includes the city of Seattle, from 1917 to 1925. These bureaus were organized primarily to contract for state work, guaranteeing the workers who belonged to the bureau a free choice of physicians.

A bureau of the present pattern was organized in Yakima County in 1931. In May 1933 the King County Medical Society was instrumental in organizing a King County Medical Service Bureau to compete with existing contract groups and to block a proposal by an insurance company to sell health insurance and to hire physicians to render the necessary medical care. The details of this bureau will be explained later. Other county societies organized medical service bureaus until at one time there were thirteen in operation. In 1933 a state medical bureau was set up to coordinate the work of the local service bureaus, to assist in raising their standards and to cooperate with the state medical association in the solution of those questions which involve the business side of medicine. In a resolution adopted by the 1933 house of delegates the state bureau was instructed "not only to minimize contract practice but to confine it to those individuals whose income is within the lower bracket."

Briefly the structure of a medical service bureau is as follows: The bureau in each locality is directed by the board of trustees elected by and from the physician members of the bureau. A nonprofit corporation is also provided, as a separate and distinct agency, to handle the collection of premiums and the payments to the physicians. The administrative problems of the corporation are turned over to a group of directors selected by the trustees. To supervise the professional services rendered, a physician is appointed as medical director. A manager is chosen to run the office and to establish agreements with employers and employed groups. The original working capital has come normally from initial membership donations of $5 to $10 for each participating physician. These donations were later returned in some counties.

Each physician member must enter into an agreement with the corporation by which he authorizes the corporation to offer his services to employed groups, to accept payment for services on the basis of a given fee schedule, services to be paid for either in full or on a proportionate basis. No member of the county medical society is permitted to accept or hold any other contract. Normally there is a minimum enrolment group stipulated in the plan, and a maximum monthly salary is set for individuals who will be covered under the plan.

The rate of the payment made by the employee varies with the individual plans and with the scope of benefits offered.

Services offered vary from full coverage to coverage for acute cases only. Usually such payments are by a check-off system. At the time of sickness the patient may, for general services, choose any physician on the list of participating practitioners. The bureau is responsible for the identity of a subscriber applying for service, and a practitioner is expected to report to the bureau immediately when a patient applies for treatment and when the treatment has been completed.

The attending physician submits voucher and statements of the cost of medical service rendered for each case, summarizing them in a monthly statement submitted to the bureau. Each statement is studied by a medical audit committee which determines, within limits, the suitability of the treatment given. That in brief is an outline of our bureau structure.

I was asked to discuss the actuarial background of the medical service bureau plans. Owing to the circumstances of contract practice previously mentioned, the actuarial factors could receive but little consideration. It was not a question of what was a proper rate to be charged to guarantee adequate compensation to the physician but more a question of what rate the traffic would bear, that is, What was a rate which could be charged the employed worker which would not be out of proportion to the rates being charged by the contract groups?

Some facts relative to the present operation of the bureaus follow. At the present time there are medical service bureau plans in operation in eleven counties, and in two other counties the structure exists but no actual plans are in operation. The state medical bureau itself is relatively inactive, although it was very active in the period from 1935 through early 1938, when medical care for relief clients in this state was administered by the state bureau and handled through the local bureaus. There are now more than 86,000 people covered under contracts with the various bureaus, the number varying from 1,500 in the smallest to 10,000 in Pierce County, 12,000 in Spokane County and 35,000 in King County.

There is wide variance in the type of services rendered by the different plans. In some, complete medical care is given except for venereal diseases and for diseases peculiar to sex. In others, the inclusion is virtually for acute cases only. Drugs are supplied under some plans and not under others. In a resolution adopted by the board of trustees of the state medical association in 1938 a request was made that each bureau divorce the medical care features from other features of the plan, such as hospitalization. To date, no bureau has conformed to this suggestion, believing that selling a plan of medical care alone would place it at a competitive disadvantage with existing groups which offer both medical care and hospitalization at a lower rate than the service bureaus do.

Considerable dissatisfaction has been expressed by many physicians over the hospitalization feature in that the hospitals are paid in full for their services at a rate comparable to that charged private patients for similar services, while the physician has to accept a unit payment on a fee schedule which is usually less than the fees charged to nonbureau patients. Whereas the unit of payment to the physician has not increased materially since the inception of the plans, in some of the bureaus there has been one or more increases of daily allowance made to the hospitals. However, the cost of hospital service to the patient is less than under most group hospitalization plans, partly because of lower administrative costs.

The average premium rate charged the workers varies widely, and it is difficult of exact comparison because of the difference in the medical services being included. The rate varies from $1.25 to $2.50 a month by different localities. In some bureaus a different rate is charged for the male and the female worker, and in those which have a complete family coverage a separate charge is made for the worker, his wife and his family. While there has been a gradual increase in average premiums to the present time, in one case from 65 cents to $1.75 a month, the average unit payment to the physician has not increased proportionately as increased other costs have eaten into the increased premium.

It is believed by some physicians that they are not adequately compensated for the work performed; but the majority seem to feel that the remuneration is fully as much as could be collected from a similar low income group as private patients. The plan is less advantageous to the specialist because he must accept the same fee as the general practitioner. The general practitioner would be willing for the specialists to receive higher fees provided they would see only those patients referred to them and not patients who choose the specialist directly.

The method by which the physician is compensated also varies widely. In some bureaus the physicians are paid a fixed unit of the charges billed against the bureau for the month. In others the receipts for the month are pooled, administrative, hospital and other fixed charges are deducted, the total amount of all physicians' bills is computed, and each doctor is paid his pro rata share of the net income. Because of the seasonal nature of the work of some physicians who specialize in certain types of work, the latter method has been subject to considerable criticism. That is, a doctor specializing in internal medicine might treat a number of pneumonia cases in the winter months when the total drain on the bureau income is great and yet not treat many bureau cases in the summer months when the unit of payment is proportionately much higher.

In reply to a questionnaire as to the percentage which the physicians receive of their fees charged, answers were received from the eleven bureaus ranging from "50 per cent of the liberal fee schedule" to "100 per cent of the schedule." Because of lack of comparative information regarding schedules, it is not known whether this 50 per cent payment results in as much actual money to the physician per case as the 100 per cent payment. An incomplete analysis shows, however, that between 60 and 70 per cent of the income of the various bureaus is disbursed to the participating physicians.

Three of the bureaus are now experimenting with family contracts. In one the rate for the employee is $1.75 a month, and $1.75 for the wife and for each child. In another the family rate is $2.25 a month exclusive of the head of the house. The latter plan has been a definite failure for the first six months of operation and is now in the process of another six months' trial. The other bureau has more than 300 families under contract with a rate of $1.75 for the employee, $2 for the women and from 75 cents to $1 for the children. The managers of the other bureaus state that there is much pressure being brought to force them to take family contracts but that they do not propose to do so.

Medical service agreements for industrial insurance cases are drawn up between the employers and some of the medical service bureaus under the supervision of the state department of labor and industries. Two separate systems are in operation for payment to the physician for such state work. In King County the physician doing this work receives only the same unit as is paid for other bureau cases. In Spokane County, however, the physician is paid 100 per cent of the departmental fees for state work and receives a unit payment for all other bureau cases. Most bureaus are contemplating giving up their state contracts for one reason or another.

This rather rambling discussion has been designed to show the extent of the experience and the experimentation which has been carried on in our medical service bureaus. It has not been an attempt to compare the various plans in operation, as they differ too widely in coverage, premium rate and fee schedule to permit exact comparison. For the remainder of the time allotted I propose to explain in slightly more detail the operation of the King County Medical Service Bureau, which is the largest and one of the oldest bureaus in operation in the state of Washington.

The King County Medical Society appointed a committee to study the advisability of adopting a medical service bureau in March 1933. The next month the society adopted a constitution and a set of by-laws for a King County Medical Service Bureau. The purpose for which this bureau was organized, as stated in the by-laws, was "to cooperate with the King County Medical Service Corporation in securing for low wage earners and their families health services, including the benefits of medical and surgical care and treatment, hospitalization and nursing, of which many such individuals and their families have heretofore been deprived." Eligibility for membership was to include any member of the society eligible for the staff of a standardized hospital, who had practiced medicine in the county for three years. The officers of the bureau consisted of a president, vice president, secretary and two other trustees.

At the same time the county society voted to approve articles of incorporation for a King County Medical Service Corporation, to exist independently of the society. The corporation was not a stock company and the membership was to be limited to subscribers. The management was vested in an elected board of five trustees, who in turn were to select a president, a vice president and a treasurer from their own membership.

The tie-up between the service bureau as an agency of the society and this corporation was effected through a medical advisory board to consist of five members, none of whom were to be members of the board of trustees of the bureau or of the corporation. The chairman of this advisory board was to be the medical director of the corporation. The other four members were to be elected at the annual meeting by members of the bureau. The duties of this board were to handle all matters of dispute arising between members of the King County Medical Service Bureau and the King County Medical Service Corporation.

The payments to any one physician under the original by-laws of the service bureau were to be limited to a maximum of $3,600 in any year. In May of 1933 this $3,600 a year restriction was deleted, and it was decided also that members of the society with existing contracts were to be permitted to retain them until termination, at which time the contracts should go to the service bureau.

Contracts for medical care were to be limited to groups of six or more employed persons making $150 a month or less. The inclusion was broad enough to cover practically all care except chronic conditions, venereal diseases, diseases peculiar to sex, pregnancy, insanity, cancer, tuberculosis and like conditions, and the premium rates varied from $1 to $1.50 a month. Circulars listed the benefits available to employees, as medical service, hospital care, ambulance, specialists, first aid and x-ray examination. Free choice of subscribing physician was provided. By the end of the first year of operation the corporation had medical care contracts with more than 15,000 employees, and the gross income for this year was approximately $82,600.

It was charged in an editorial appearing in the *Bulletin of the King County Medical Society* in October 1934 that "the fees at which this service is sold are too low," and further that "these low fees are upsetting the public valuation of service as applied to private practice." This premium rate of $1 to $1.50 had no exact relation to the cost of rendering the service, however, as it was based primarily on a competitive rate with private contract doctors. The majority of the physicians in King County holding private contracts, when confronted with the alternative of relinquishing their contracts or being denied membership in the bureau, eventually gave up their private contracts.

There was a gradual increase in premium rates as the covered employees became more aware of the superior type of care being made available through the facilities of the service bureau as against those of private contract doctors. Certain contract physicians with large staffs still remain in Seattle to the present time and have prevented these rates from being placed on a sound actuarial basis for the type of service which is rendered. The unit payment to the physician has also been increased from the original 50 per cent to a unit of 60 per cent.

At the present time there are approximately 35,000 persons under contract. Because of the fact that the physician does bureau work at a low cost figure the corporation is making no attempt now to increase the number under contract, except that it will normally take groups which have previously been under contract to various private contract physicians. More than 440 of the approximately 600 physicians in the county society do bureau work, and it is stated that every general practitioner in the society is included. The pediatricians, obstetricians and certain other specialists, of course, are not under contract because of the exclusion of their services in the contracts with the employees.

For the year ended May 31, 1939, the service bureau had a total income of more than $628,000. Distribution of the subscriber's dollar for this period is as follows: available for physicians' services, 70 per cent; hospital services, 18 per cent; administrative expense, 7 per cent; nursing, 2 per cent; medicines prescribed, 1 per cent (that has been eliminated in the last year or so; we are not giving medicine in any of the first aid contracts); first aid, appliances and ambulance, 2 per cent. Not all of the 70 per cent of the total income available for physicians' services was needed for the 60 per cent unit of the fee schedule now being paid, and approximately $23,000 of the total available of $442,000 was placed in reserve. This reserve now, I was told before I left, is about $50,000. Based on this experience there was recently another upward revision made in the fee schedule; instead of increasing the unit percentage they just increased the fees in the schedule.

As a matter of fact, the entire development of the medical service bureaus in Washington has been on an experimental basis, with the rates, the coverage, and the inclusion of service being sufficiently flexible to permit changes as more experience was obtained. I might say that it is still on an experimental basis and is being revised from time to time, and I think that it will be better revised. Throughout our process of experimentation, however, the service bureaus have adhered to two fixed ideas: the one that, irrespective of the low charge, the highest type of service should be guaranteed to the covered employees, the other that the bureaus should maintain the fundamental right of every man to have a free choice of physician, with no interference by any third party in the relationship of the patient to the physician of his choice.

### Formation of Plans in Pennsylvania

DR. C. L. PALMER, Pittsburgh: This opportunity to discuss voluntary insured medical services from the point of view of the Medical Society of the State of Pennsylvania is greatly appreciated. As this subject is one about which limited data and statistics are available and with which there is little practical experience up to the present time, the discussion here today will be the result of experiences regarding the formation of these plans, which experience will no doubt be very similar throughout the states in which these plans are now in the developmental stage. Time does not permit going into the details of all phases of the plan in Pennsylvania. It is to be hoped, however, that much will be brought out in the discussion.

It might be profitable to consider the acts as they are now written on the statute books of the commonwealth of Pennsylvania. With the help of Dr. William C. Woodward, of the Bureau of Legal Medicine and Legislation of the American Medical Association, together with attorneys familiar with bill drafting, constitutional requirements and legislative procedures in Pennsylvania, two bills were drafted which are now acts 398 and 399. During the course of these bills through the legislature a number of different groups became interested. The insurance group, the healing arts group outside the medical profession, political organizations and hospital service associations took a rather active part in attempting to amend or prevent the enactment of these legislative measures.

Act 398 is an amendment to the nonprofit corporation act of 1933 authorizing the establishment, maintenance and operation of nonprofit medical service plans whereby medical services may be provided through any doctor of medicine to subscribers of low income and their dependents. This act provides a special procedure for the incorporation of nonprofit medical service corporations. It provides that nine or more citizens of the state shall be eligible to become directors, the majority of whom must at all times be licensed doctors of medicine. It defines the income group, medical services, persons with dependents and subscribers of low income, and provides for the procedure in obtaining a charter and to exemption, and sets up reserves and the manner of dissolution.

Act 399 provides for the regulation and supervision of these corporations by the department of health and the insurance department. This act makes a declaration of necessity, stating that it is hereby essential that adequate medical services be provided to the residents of the commonwealth for the maintenance of their physical and mental health, especially for persons of the low income group who are unable to provide such services for themselves without depriving themselves or their dependents of the necessities of life while at the same time maintaining the progress of science and art of medicine. It provides that no such corporation shall be formed unless it conforms to this act.

The medical service association may divide medical services into classes or kinds and shall not provide such services to subscribers except through doctors of medicine.

It provides for emergency services to those regularly domiciled within the state and medical services for those living on the borders of the state. All medical services must conform to the best medical practice in the community at the time, but the association shall not be liable for injuries resulting from negligence, misfeasance, malfeasance, nonfeasance or malpractice on the part of any officer or doctor of medicine. The relation between the subscriber and his dependent and the doctor of medicine shall be identical with the relation that ordinarily exists in a community between a physician and his patient. All disputes or controversies shall be disposed of only by doctors of medicine selected in a manner prescribed in the by-laws. It empowers relief officers to make contracts with the organization for the medical care of the indigent, defines supervision by the department of health and the insurance department, has a severability clause in it and repeals, modifies and varies no law now in force relating to the practice of medicine and surgery.

It is the belief of those of us in the Medical Society of the State of Pennsylvania who are familiar with these acts that they are as comprehensive and inclusive as any that can be obtained under present conditions, maintaining as far as possible all the traditions, ethics and principles of the medical profession.

A tentative plan has been drafted which conforms to actuarial principles and legal requirements, which is now under consideration by designated committees of the Medical Society of the State of Pennsylvania. The plan has been sent to officers and members of committees of the various component county medical societies for constructive comments. Constructive comments so far can be divided into several classes:

1. Those which emphasize the individualism so prevalent among physicians. Comments of this classification are such that those physicians attempt to develop barriers of various kinds in order to prevent any form of regulation whether it be governmental corporate or under the supervision of their own profession. These individuals apparently have no desire to be bothered with the details of a study of any plan or be involved in carrying out the mechanics of such a plan. Some suggestions show lack of understanding and a misinterpretation of the plan. Some commentators apparently have the motive of scuttling any plan and from evidence obtainable were prompted by aid proffered by certain selfish interests, such as hospital service associations. It is difficult for these individuals to see the necessity for the medical profession to do anything about this. They have not felt the effects of the gradual encirclement and encroachment on the activities of the medical profession by legislative procedures.

Some think this is the entering wedge for a complete government and political control or socialized medicine. It is very evident to those working with legislation that the entering wedge for socialized medicine was developed a number of years ago.

It can be assumed that this activity on the part of the medical profession will prolong the establishment of government control in this country for an indefinite period and if this should come the mechanics for carrying out such a government plan could be developed under the supervision of the medical profession with the retention to a very large extent of the traditions, ethics and principles of practice as it has existed during the life of this country.

Other comments are sincere and show evidence of careful thought and really suggest constructive changes. It seems very evident that under present changing economic conditions something more must be accomplished to enable the medical profession to take its position in society in general and assume the responsibilities of such a position.

With all these changing opinions and chaotic conditions it seems difficult for the profession to convince political organizations and the general public that the power vested in the medical practice acts and the moral and traditional sentiments expressed in our Code of Ethics to be carried out by medical organizations are adequate to meet the requirements of present conditions. Therefore it seems advisable that something more be done to enable the profession to meet the demands and retain the spirit of private enterprise in this country and this type of legislation offers the best facilities for accomplishing such an end that is known at present.

### Pennsylvania Plans

DR. WALTER F. DONALDSON, Pittsburgh, Secretary, Pennsylvania State Medical Society: First of all there was no question about the justification of the development of a plan for Pennsylvania, because in every session of the Pennsylvania legislature for the last five or six regular sessions we have had presented a bill which incorporated the compulsory health insurance, and it has been necessary on all occasions to defeat that legislation. This year in the legislature, had we not been in the foreground, we would never have been in position to defeat legislation setting up a similar plan to be incorporated with insured hospitalization service as you all know it and the same service offered by a group of dentists, nurses and pharmacists incorporating the services of physicians.

Pennsylvania has not gone off half cocked in preparing to meet this problem. The bill which was passed by the Pennsylvania legislature was well prepared, having been prepared on the advice at all stages of its preparation by no less an authority than the Director of the Bureau of Legal Medicine and Legislation of the American Medical Association.

We have had one or two surprise elements, not the least of which was what I have already mentioned, the willingness of other organizations and groups who sell service to the sick to offer this plan to the legislature and to carry us along with them.

You may hear within the next few weeks that we are meeting with difficulty in Pennsylvania. We were authorized by our 1938 house of delegates to go ahead, prepare the legislation and have it passed, if possible, and when we were ready to present the plan to the 1939 house of delegates of our state society we were given a surprise complication in the form of a photostat copy of our preliminary plan, which had been rather widely distributed, innocently enough we believe, to our delegates before they came to the session, omitting from the photostat copy an explanatory introductory letter which said "This is being given to you for your study, for your comments, and for revision as you may advise it."

If you are ever going to bring it up in your state medical society, use all the effort you possibly can to guarantee that your membership may thoroughly understand it as you go along. We thought we were doing it thoroughly enough, but we were astonished to find that our men apparently could not absorb the skeleton construction as we are passing it around in that graph. They can understand proposed agreements between physicians and the corporation; they can understand fee bills, but you must make every effort to have it clear to them just what is meant as it is embodied in the legislation.

#### DISCUSSION

DR. NATHAN SMITH DAVIS III, Chicago: Last spring an insurance man was introduced to me. He told me about a policy he had written for the Boston Store employees in Chicago, many of whom are earning under $1,000 a year. For this Boston Store group he worked out a plan—the group being one that had about 65 per cent of women in it—that would pay $4 a day for hospital or sanatorium care plus $20 for extras with each admission, and as many admissions a year as were necessary and as long, each one, up to thirteen weeks in length up to age 60, and from age 60 to 70 only one admission a year. After age 70 they wouldn't take them. The only exceptions in the policy were pregnancy during the first ten months and anything in which there was employer's liability included. This coverage cost the Boston Store group 65 cents a month. He sold the insurance to more than 60 per cent of the employees of the Boston Store in eleven days. He was the only salesman involved and he did not talk to very many of the employees; in fact, he talked only to the committee with which he worked out the policy, but that committee did the rest of the selling and 60 per cent, or more than 800 employees, were signed up in eleven days. At Butler Brothers' it took only seven days to get the same number of employees from the same sales method. The low price is partly due to the fact that his is the only commission involved. I also heard him talk to some groups and was much impressed by his talking against government insurance. I thought it would be a good matter to bring it before the medical profession. He prepared a policy for the Chicago Medical Society providing $6 a day, plus $30 for extras, that had the same number of weeks coverage and also the exemptions, including previous illnesses,

diagnosis, mental cases, tuberculosis and social diseases in the policy. The charge is $10 a year. It was approved by the council at almost its last meeting last spring, and the sale had to be made exclusively by mail because neither the society nor its branches met again until October. Eighteen hundred of our 3,000 or so eligible members have already joined. Shortly a family coverage policy will be added, and that will be higher, I think $15 a year for the wife, $1 and a few cents a year for each child and the coverage will total approximately $485 in any one year for the wife and children together. This type of policy can really be written only if there is a group of 1,000 or more involved. If the claims fall below a certain percentage there is a dividend to the insured. That factor makes it almost impossible for many of the county medical societies of the country to take the policy as we have it here in Cook, where we have some 4,200 or 4,300 members. It makes it something much better suited for a state society to undertake. We feel it is a good example to the public, which does favor the indemnity type of insurance, which the house of delegates has favored rather than a service policy. I think that a policy such as the Chicago Medical Society has is something that state societies all over the country might well consider for their own membership, not only for the benefit to the members but for the example it sets to the public.

DR. W. C. WOODWARD, Chicago: During the last sessions of the several state legislatures medical service acts were passed in Connecticut, Michigan, New York, Pennsylvania and Vermont. We have had analyses of those acts prepared and will distribute them. There is one feature of the Pennsylvania act that I believe is insufficiently appreciated. It is not sufficient protection to the profession to provide that an incorporation to furnish medical services shall be a nonprofit corporation. One might suppose the fact that an enabling act providing that services of this character could be furnished only by a nonprofit corporation would afford adequate protection against a multiplicity of corporations. Those of you who have looked into the matter, however, doubtless know that a nonprofit corporation does not primarily mean a corporation that does not make money. It means a corporation that does not distribute money among any interested shareholders or stockholders. In this act the law requires, in the first place, that the application for articles of incorporation shall be approved by the department of insurance. It provides that the application shall then be approved by the state department of health. Any nonprofit corporation might bring itself within those limits. But then comes the final protection, because it provides, after these two approvals have been given, "the court shall not approve such application unless and until the articles are returned by the insurance department and unless both the department of health and the insurance department shall have endorsed its approval thereon. The court shall be guided solely by public necessity and public interest and welfare in approving or disapproving the articles of incorporation." In other words, if there are within any given area corporations organized under this act, or if there are in any given area sufficient facilities already to meet the needs of the community, the court is to be guided by the public necessity. This law requires that a majority of the incorporators be doctors of medicine and that a majority of the directors be at all times doctors of medicine. Dr. Palmer has already called your attention to the fact that the act itself practically defines what shall constitute a medical need. It gives the income a family may have in order to come within the group. But then the act regulating the conduct of these organizations goes further and provides that "any person, partnership, association, common law trust, or corporation that violates any provision of this act or of any order of the department of health or of the insurance department made pursuant thereto, any person who hinders or prevents the department of health or the insurance department in the discharge of any duty imposed on it by this act, any person who fraudulently procures or attempts to procure any benefit under this act, and any person who wilfully makes any false statement in any proceeding or report under the provisions of this act, shall be guilty of a misdemeanor and, on conviction thereof, shall be sentenced to pay a fine of not more than $1,000, or to be imprisoned for not more than six months, or both, in the discretion of the court." Some question has been raised as to the feasibility of organizing medical service corporations outside the ordinary insurance laws, on the theory that there is some special power or dispensation that favors physicians with respect to the matter. You want to go slow in availing yourselves of any such supposed privilege. You want always to remember that, if you can organize a corporation and provide for the furnishing of medical services on a prepayment plan or the indemnification of subscribers for the costs of medical services on a prepayment plan, then you will find that others in the community, lay or medical, will be able to do the same thing unless you have had some special statute that will prevent it. *(To be continued)*

# OFFICIAL NOTES

## ANNUAL CONGRESS ON INDUSTRIAL HEALTH

The second Annual Congress on Industrial Health, sponsored by the American Medical Association, will be held Monday and Tuesday, January 15 and 16, at the Palmer House in Chicago.

Topics and speakers are as follows:

### OPENING SESSION, MONDAY MORNING, 9:45

*Report of the Council on Industrial Health.*
STANLEY J. SEEGER, M.D., Chairman, Milwaukee.

*Vocational Rehabilitation in Relation to Medical Practice and Workmen's Compensation Procedure.*
TERRY C. FOSTER, U. S. Office of Education, Washington, D. C.

*Industrial Psychiatry and Mental Hygiene.*
LYDIA G. GIBERSON, M.D., New York.

*Adequate Nutrition for the Industrial Worker.*
LELA E. BOOHER, PH.D., U. S. Department of Agriculture, Washington, D. C.

### MONDAY AFTERNOON, 2:15

*SYPHILIS IN INDUSTRY*

*Syphilis in Industry with Special Reference to Its Incidence and Relation to Trauma.*
EARL D. OSBORNE, M.D., Professor of Dermatology and Syphilology, University of Buffalo School of Medicine, Buffalo.

*Syphilis Case Finding in Industry.*
ALBERT E. RUSSELL, M.D., Surgeon in Charge, Office of Syphilis Control in Industry, U. S. Public Health Service, Chicago.

*Integrating Syphilis Control Between the Industrial and the Private Practitioner.*
HAROLD A. VONACHEN, M.D., President, Central States Society of Industrial Medicine and Surgery, Peoria, Ill.

*Syphilis and Employment.*
HARVEY BARTLE, M.D., Chief Medical Examiner, Pennsylvania Railroad, Philadelphia.

### MONDAY EVENING, 6:30

An informal dinner and round table discussion, intended primarily for members of state and county medical society committees on industrial health, will be held. The subject matter for discussion will include problems of organization and plans for future activity.

### TUESDAY MORNING, 9:30

*PHYSICAL EXAMINATIONS*

*Objectives of Health Examinations and Their Industrial Applications.*
McIVER WOODY, M.D., President, American Association of Industrial Physicians and Surgeons, New York.

*The Private Practitioner and Industrial Physical Examinations.*
RAYMOND HUSSEY, M.D., Chairman of Committee on Industrial Health, Medical and Chirurgical Faculty of the State of Maryland, Baltimore.

*The Wisconsin Plan for Physical Examinations in Industry: The Point of View of the Industrial Commission.*
HARRY A. NELSON, Director, Workmen's Compensation, Industrial Commission of Wisconsin, Madison, Wis.

*Scope and Methods of Industrial Physical Examinations of the Wisconsin Plan.*
PAUL A. BREHM, M.D., Chairman of the Medical Subcommittee on Physical Examinations in Industry, Industrial Commission of Wisconsin, Madison, Wis.

### TUESDAY AFTERNOON, 2 O'CLOCK

*DISABILITY EVALUATION*

*Hearing Loss—Estimation of Disability.*
AUSTIN HAYDEN, M.D., Chairman Consultants on Audiometers and Hearing Aids, Council on Physical Therapy, American Medical Association, Chicago.

*Present Status of Estimating Disability from Visual Loss.*
HARRY S. GRADLE, M.D., Chicago.

*Are Uniform Standards of Disability Evaluation Practicable?*
EARL D. MCBRIDE, M.D., Oklahoma City.
*Critique of Disability Evaluation.*
HENRY H. KESSLER, M.D., Newark, N. J.

WEDNESDAY, JANUARY 17

On the day following the Congress on Industrial Health, the Chicago Medical Society will conduct all day clinics illustrating practical problems in industrial medicine and traumatic surgery at St. Luke's Hospital in Chicago. These programs are under the direction of DR. HARRY E. MOCK. On the same day the Chicago Medical Society will conduct a dinner and evening meeting to be addressed by DR. VILRAY P. BLAIR, St. Louis, on "Treatment of Facial Deformities Caused by Injury." These presentations will be available to registrants at the congress, all of whom are invited to participate. The program follows:

9:00—St. Luke's Tumor Group.
Subject: *Malignancies Allegedly Due to Trauma.*
(*a*) *Pathologic Demonstration.* EDWIN F. HIRSCH, M.D.
(*b*) *Demonstration of Cases.* PAUL H. HOLINGER, M.D., CHARLES E. SHANNON, M.D., and JOHN D. ELLIS, M.D.
(*c*) *X-Ray Demonstration of Tumors Allegedly Due to Trauma.* EDWARD L. JENKINSON, M.D.
10:00—*Spontaneous Collapse of the Lung.* JAMES A. BRITTON, M.D.
*Demonstration of Cases.* THOMAS COOGAN, M.D.
10:30—*Injuries of the Chest.* WILLARD VAN HAZEL, M.D.
11:00—*Trauma in Diabetes and Peripheral Vascular Disease.*
(*a*) *Medical Aspect.* ROBERT W. KEETON, M.D., CHESTER COGGESHALL, M.D., and CARL A. JOHNSON, M.D.
(*b*) *Surgical Aspect.* GEZA DE TAKATS, M.D., S. PERRY ROGERS, M.D., and HARRY E. MOCK, M.D.
12:00—*X-Ray Problems in Industry.* HOLLIS E. POTTER, M.D.
12:30—Buffet Luncheon served at St. Luke's Hospital.
1:30—*Compression Fractures of the Spine.* EDWIN W. RYERSON, M.D.
2:15—*Surgical Demonstration.* SELIM W. MCARTHUR, M.D., H. E. JONES, M.D., and ASSOCIATES.
2:45—*Lead Encephalopathy.* GEORGE W. HALL, M.D.
3:00—*Supracondylar Fractures of the Femur.* WILLIAM CUBBINS, M.D.
3:20—*Fractures of the Tibia into the Knee Joint.* T. L. HANSEN, M.D.
3:40—*Coronary Thrombosis and Trauma.* N. C. GILBERT, M.D., and G. K. FENN, M.D.
4:00—*Demonstration of Holding Power of Various Screws used in Bone.* WILL F. LYON, M.D.
4:20—*Physical Therapy Demonstrations.* JOHN S. COULTER, M.D.
6:30—Dinner, Chicago Woman's Club, 72 East Eleventh Street.
8:30—Auditorium Chicago Woman's Club, 72 East Eleventh Street.
*The Treatment of Facial Deformities Due to Trauma.* VILRAY P. BLAIR, M.D., St. Louis.
Discussion. FREDERICK MOOREHEAD, M.D., and HERBERT A. POTTS, M.D.

For Clinic tickets apply Chicago Medical Society, 30 North Michigan Avenue.

## ADDRESSES BY OFFICIAL STAFF

DR. W. W. BAUER:
January 8—High School, Chariton, Iowa.
January 8—Woman's Club, Chariton, Iowa.
January 8—Lion's Club, Chariton, Iowa.
January 9—Appanoose County Woman's Club, Centerville, Iowa.
January 9—Commercial Club, Centerville, Iowa.
January 9—High School, Centerville, Iowa.
January 17—Beverly Hills Woman's Club, Chicago.
January 19—Family Health Association, Cleveland.
January 26—Portage Park Woman's Club, Chicago.
February 2—Wilmette Congregational Church, Wilmette, Ill.

DR. MORRIS FISHBEIN:
January 3—Temple University Medical School, Philadelphia.
January 3—Rotary Club, Philadelphia.
January 3—Men's Club, Temple Keneseth Israel, Philadelphia.
January 10—Fort Smith Junior College, Fort Smith, Ark.
January 11—Sebastian County Medical Society, Fort Smith, Ark.
January 12—Tulsa County Medical Society, Tulsa, Okla.
January 16—Annual Dinner of Catholic Charities Bureau, Indianapolis.
January 19—Methodist Hospital, Indianapolis.
January 25—Connecticut State Medical Society, Hartford, Conn.
January 30—Missouri Social Hygiene Association, St. Louis.
January 31—Morton High School, Auspices of Western Electric Company, Chicago.

DR. R. G. LELAND:
January 9—Accident and Health Association of Chicago, Chicago.

DR. ROCK SLEYSTER:
January 17—District of Columbia Medical Society, Washington, D. C.

DR. PAUL A. TESCHNER:
January 19—Elmhurst Hospital Guild, Elmhurst, Ill.
January 23—Barrington Parent Teacher Association, Barrington, Ill.
January 26—Aux Plaines Auxiliary, River Forest, Ill.
January 30—North Shore Kiwanis, Chicago.
February 1—Y. W. C. A., Chicago.
February 2—Central Y. M. C. A., Chicago.

DR. NATHAN B. VAN ETTEN:
January 9—De Lamar Lecture, School of Hygiene and Public Health, Johns Hopkins University, Baltimore.
January 25—National Health Council, New York.
January 30—Queens County Medical Society, New York.

# WOMAN'S AUXILIARY

### New Jersey

The auxiliary to the Camden County Medical Society met at the home of Mrs. Max L. Weimann, president, in Haddon Heights October 3. Speakers were Miss Ruth M. Outland, principal of the Friends' School of Haddonfield, Mrs. Edward Catlett and Richard Wood, of Philadelphia, a representative of the Friends' Peace Committee.

The auxiliary to the Hudson County Medical Society met in Jersey City October 2. The auxiliary observed its twelfth anniversary by adding twelve members to its group.

The auxiliary to the Ocean County Medical Society met in Barnegat at the home of Mrs. Frederick N. Bunnell October 7. Mrs. Howard Hornberger, Roebling, spoke on the necessity of the auxiliary's assisting in the effort to secure funds for the relief of widows and orphans of physicians.

### Oregon

An auxiliary to the Mid-Columbia Medical Society, comprised of physicians from Hood River, Wasco, Morrow, Sherman, Gilliam, Wheeler and Grant counties, was organized November 13.

A meeting of the board of directors of the auxiliary to the Oregon State Medical Society was held in Portland November 14. Dr. Charles E. Hunt, president of the Oregon State Medical Society, addressed the group. Dr. John H. Fitzgibbon, Oregon member of the House of Delegates of the American Medical Association, addressed the auxiliary to the Multnomah County Medical Society at its October meeting in Portland.

### Virginia

The auxiliary to the Northampton-Accomac Medical Society met at the home of Mrs. O. R. Fletcher in Sanford October 10. Delegates to the annual meeting of the auxiliary to the Medical Society of Virginia in Richmond October 4-7 reported that the Northampton-Accomac auxiliary received the exhibit award at the state meeting. The objective for the year is work in behalf of the Northampton-Accomac Memorial Hospital at Nassawadox. Chairs for patients' rooms were provided by the auxiliary recently.

### Washington

The Walla Walla County Medical Society appointed a committee November 9 to provide publicity for the broadcasts of the Washington State Medical Association which are given on the Mutual Network from Seattle each week.

# Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

## ALABAMA

**Society News.**—Dr. Norman Van Wezel, director of the Montgomery Tuberculosis Sanatorium, addressed the Houston County Medical Society November 3 on "Treatment of Pulmonary Tuberculosis."——The Calhoun County Medical Society was addressed in Anniston November 2 by Drs. Groesbeck F. Walsh and Robert M. Pool, Fairfield, on "Twins and Twinning."

## ARKANSAS

**District Meeting.**—At a meeting of the Ninth Councilor District Medical Society in Harrison December 5 the speakers were Drs. Davis W. Goldstein, Fort Smith, on cancer; George V. Lewis, Little Rock, diagnosis and treatment of goiter; Merlin J. Kilbury, Little Rock, blood stream infection; John N. Compton, Little Rock, jaundice, and Charles T. Chamberlain, Fort Smith, pneumonia.

## CALIFORNIA

**Copley Medal Awarded to Dr. Morgan.**—The Royal Society in November awarded the Copley Medal to Thomas Hunt Morgan, Ph.D., since 1928 director of the William G. Kerckhoff Laboratories at the California Institute of Technology, for "his establishment of the modern science of genetics, which revolutionized the understanding not only of heredity but of the mechanism and nature of evolution," according to the New York *Times*. Dr. Morgan was born in Lexington, Ky., in 1866. He was the first person who was not a physician to receive the Nobel Prize in medicine, which in 1933 was awarded to him for his work on theory of the gene.

## CONNECTICUT

**Committee Named to Revise Medical Curriculum.**—A committee has been appointed at Yale University School of Medicine, New Haven, to review the present course of studies for the purpose of recommending curricular revision, according to the New York *Times*. The committee, composed largely of younger members of the faculty, has been given a wide scope. It has been told to survey the whole plan of instruction in the light of the school's primary educational objective in giving broad training to qualified men and women for medical work. The committee has no time limit, but its recommendations will be checked and considered by the permanent officers of the school's faculty. Recent reports in THE JOURNAL and other publications indicate that the curriculum is being adjusted to advances in knowledge, new points of view and changes in social and economic conditions. One possible revision is a breaking down of the artificial separation between the so-called preclinical and clinical years, it was said. Members of the newly appointed committee include: Dr. Hebbel E. Hoff, associate professor of physiology, chairman; Dr. Warren T. Brown, assistant professor of psychiatry and mental hygiene; Philip B. Cowles, Ph.D., assistant professor of immunology; Dr. Daniel C. Darrow, associate professor of pediatrics; Alfred Gilman, Ph.D., assistant professor of pharmacology and toxicology; Dr. John C. Leonard, instructor in medicine; Dr. Gustaf E. Lindskog, assistant professor of surgery; Leon S. Stone, Ph.D., associate professor of anatomy; Dr. Herbert Thoms, associate professor of obstetrics and gynecology; John H. Watkins, Ph.D., assistant professor of public health; Abraham White, Ph.D., assistant professor of physiologic chemistry; Drs. Harry M. Zimmerman, associate professor of pathology, and Stanhope Bayne-Jones, dean, ex officio.

## FLORIDA

**Personal.**—Dr. George S. McClellan, Pompano, has been appointed a member of the state board of medical examiners, succeeding the late Dr. Corbett E. Tumlin, Miami. Dr. Isaac W. Chandler, Avon Park, has also been appointed a member of the board.

**Society News.**—Officers of the Florida East Coast Medical Association chosen at its twelfth annual session in Ponte Vedra in November include Drs. Isaac M. Hay, Melbourne, president; Edwin C. Swift and Arthur J. Logie, both of Jacksonville, vice presidents, and Joseph S. Stewart, Miami, secretary. ——Dr. William H. McCullagh discussed "Myotonia Congenita" before the Duval County Medical Society in Jacksonville November 7.

## IDAHO

**Society News.**—Herald R. Cox, Sc.D., U. S. Public Health Service, Hamilton, Mont., discussed "Nine Mile Fever" at a meeting of the Idaho Falls Medical Society November 6.—— Dr. Arthur F. Cunningham, Spokane, Wash., addressed the North Idaho Medical Society, Lewiston, November 15 on plastic surgery.

## ILLINOIS

**Physicians Honored.**—Members of the Illinois State Medical Society and citizens of Scott County honored Drs. George W. Bowman, Alsey, and George M. Straight, Winchester, at a banquet November 22 held to celebrate their many years of practice. Dr. Bowman has been practicing in Scott County for fifty-nine years and Dr. Straight fifty-eight.——Drs. Walter D. Stevenson, Earl L. Caddick and Harry O. Collins were honored by St. Mary's Hospital, Quincy, with a dinner November 7 to observe their completion of twenty-five years on the staff of the hospital.

**Hospitals Cooperate in Public Relations Project.**—A group of eleven hospitals serving three counties to the west of Chicago have united in a cooperative public relations effort. The principal activity at present is a half hour radio broadcast consisting of music, health dramatizations and the presentation of hospital facts of interest to the community. The hospitals cooperating in this are Copley, St. Joseph, Mercy and St. Charles hospitals in Aurora; Sherman and St. Joseph hospitals in Elgin; the Elmhurst Community Hospital, Inc., in Elmhurst; the Community Hospital, Geneva; the Hinsdale Sanitarium and Hospital, Hinsdale; Silver Cross and St. Joseph's Hospitals, Joliet, and the City Hospital in St. Charles. Each week one of the hospitals acts as the host for the program, which includes a short history of the hospital and some pertinent community information. Dramatic material offered for the broadcast is furnished by the Bureau of Health Education of the American Medical Association. About two or three minutes toward the end of the program are devoted to a statement on some phase of hospital activity as it affects the community as a whole and the sick in particular, emphasizing always the work of the hospital and the physicians as a vital factor in the community, according to the announcement. These programs are being presented by radio station WMRO, Aurora, as a public service feature and the cost to the hospitals thus far has been small.

### Chicago

**Two Million Willed to Billings Clinic.**—The University of Chicago will receive about $2,000,000 under the will of Orson C. Wells, retired Chicago broker, who died December 10. Mr. Wells directed that the gift be used to found a permanent fund for medical education and research in connection with the Billings Clinic, a part of the Albert Merritt Billings Hospital, at the institution. The university will use the gift to meet expenses in its medical work, it was stated. The will also provides for a $50,000 bequest to the Presbyterian Hospital for use in urologic research.

**Society News.**—Dr. Hugh R. Butt, Rochester, Minn., addressed the North Shore Branch of the Chicago Medical Society January 2 on "Vitamins, Recent Advances and Their Clinical Application." Dr. Marion A. Blankenhorn, Cincinnati, discussed "The Serum and Chemotherapy of Lobar Pneumonia" before the North Side Branch January 4.——At a meeting of the Chicago Laryngological and Otological Society January 8 the speakers will be Drs. John R. Lindsay on "Laryngocele"; Gordon H. Scott, "Caries of the Vertebrae in Retropharyngeal Space Infection"; Henry B. Perlman, "The Eustachian Tube: Normal Physiology; Abnormal Patency," and Paul C. Bucy and William Tracy Haverfield, "Cranial and Intracranial Complications of Frontal Sinusitis."

## INDIANA

**Clinic for Personality Disorders.**—A child study and guidance clinic will be established early this month at the James Whitcomb Riley Hospital for Children on the campus of the Indiana University Medical Center, Indianapolis. The new clinic will seek to correct personality maladjustments in children and parents will be instructed in the best methods of controlling their children and gradually eliminating the causes of emotional disturbances. Under the supervision of Dr. David

A. Boyd Jr., recently appointed head of the department of mental and nervous diseases of the school of medicine, the clinic will be a wholly new department of Riley Hospital, it was stated. Children from all counties of the state will be eligible for admission on the same basis as child patients now are admitted for other treatment at the Riley Hospital. The new work will be financed by annual grants from a research fund created by individuals and chiefly from the Louis C. Heusmann Foundation, established as a memorial to the Indianapolis business man and philanthropist who was active in the building of the Riley Hospital. Assisting Dr. Boyd will be Dr. Exie E. Welsch, psychiatrist of the state board of health, Dr. Matthew Winters, chairman of the pediatrics committee of the school of medicine, and Dr. Lyman T. Meiks, chief pediatrician of Riley Hospital.

## MASSACHUSETTS

**Drs. Hektoen and Murphy to Give Cutter Lectures.**—Dr. Ludvig Hektoen, executive director of the National Advisory Cancer Council of the U. S. Public Health Service, Washington, D. C., will give the first of a series of two annual Cutter Lectures in Preventive Medicine at the Harvard Medical School, Boston, January 15. He will talk on the general subject of cancer control with special reference to its public health and epidemiologic aspects. Dr. James B. Murphy, Rockefeller Institute for Medical Research, New York, will give the second Cutter lecture January 22, presenting a critical review of experimental studies in cancer.

**Society News.**—Richard H. Shryock, Ph.D., professor of American history, University of Pennsylvania, Philadelphia, spoke before the Boston Medical History Club November 20 on "The Historian Looks at Medicine."——At a meeting of the Massachusetts Society of Examining Physicians November 22 Asst. U. S. Atty. William T. McCarthy, in charge of the criminal division, discussed narcotics, and Dr. William J. Brickley, Boston, "The Cause and Manner of the Squalus Deaths."——The Wachusett Medical Improvement Society was addressed December 6 by Dr. John J. Dumphy, Worcester, on "Sulfanilamide, Sulfapyridine and Related Compounds."——At a meeting of the New England Heart Association November 27 the speakers included Drs. Bernard J. Walsh, Edward F. Bland and Paul D. White on "An Autopsy Study of the Relations of Gallbladder Disease and of Peptic Ulcer to Coronary Disease" and James C. White and Howard B. Sprague, "Cervicothoracic Sympathectomy in Preference to Paravertebral Alcohol Injection for Angina Pectoris with High Radiation of Pain: New Technic." All are from Boston.——Dr. Paul R. Cannon, Chicago, discussed "Relation of Flocculating Antibodies to Tissue Hypersensitiveness and Localized Disease" before the New England Pathologic Society November 16.

## MICHIGAN

**New Dean at Wayne University.**—Dr. Edgar H. Norris, since 1938 professor of pathology at Wayne University College of Medicine, Detroit, was elected dean of the school December 12. He succeeds Dr. Raymond B. Allen, who recently became executive dean of the Chicago colleges of the University of Illinois. Born in Lagrange, Ind., in 1893, Dr. Norris graduated at the University of Minnesota Medical School, Minneapolis, in 1919. He taught anatomy at his alma mater 1915-1916 and pathology 1917-1918.

**Pediatric and Infectious Disease Meeting.**—At the eighteenth annual meeting of the University of Michigan Pediatric and Infectious Disease Society in Ann Arbor November 24-25 Dr. Mark F. Osterlin, Traverse City, was elected president; Dr. Campbell Harvey, Pontiac, vice president, and Dr. David Murray Cowie, Ann Arbor, was reelected secretary. At the opening session Dr. Clement A. Smith, Brookline, Mass., gave the presidential address, on "Maternal Anesthesia and Fetal Anoxemia in Obstetrics."

**Annual Secretaries' Conference.**—The annual county secretaries' conference of the Michigan State Medical Society will be held at the Olds Hotel, Lansing, January 21. The morning session will be devoted to round table discussions of Michigan Medical Service, medical relief, afflicted-crippled child laws, postgraduate medical education and scientific program arrangement. For the first time in Michigan a joint meeting will be held for the noonday dinner and afternoon program with the health officers of the state. Subjects for discussion will include problems of preventive medicine, immunization and new and modern procedures and developments in the field of public health.

**Conference on Industrial Medicine.**—A conference on industrial medicine and hygiene will be held at the University of Michigan, Ann Arbor, January 11-13 with Dr. Clarence D. Selby, Detroit, medical consultant, General Motors Corporation, as general chairman. Among the speakers will be:

J. J. Bloomfield, sanitary engineer, division of industrial hygiene, U. S. Public Health Service, Health Problems in Industry.

Dr. Stanley J. Seeger, Milwaukee, chairman, Council on Industrial Health, American Medical Association, Industrial Health and the Physician.

Dr. Kenneth E. Markuson, director, bureau of industrial hygiene, state department of health, Lansing, Coordination of Industrial Hygiene with Other Health Agencies in the Community.

Dr. George Van Rhee, Detroit, committee on occupational diseases and industrial hygiene, state medical society, Industrial Dermatoses.

Herbert G. Dyktor, state department of health, Lansing, Integration of Industrial Hygiene with Industrial Medicine.

William Frederick, Ph.D., and Herbert Walworth, M.S.E., bureau of industrial hygiene, Detroit department of health, Demonstration of Field Instruments Utilized in Industrial Hygiene.

Dr. Louis W. Spolyar, Indianapolis, chief, bureau of industrial hygiene, Indiana state board of health, State Industrial Hygiene Surveys.

Dr. Kenneth D. Smith, Columbus, chief, bureau of occupational diseases, Ohio state department of health, Function of the State in the Control of Occupational Diseases.

Dr. Milton H. Kronenberg, Chicago, chief, division of industrial hygiene, Illinois department of public health, Value of Records in Industry.

Additional information may be obtained from the division of hygiene and public health, University of Michigan, Ann Arbor.

## MINNESOTA

**Special Course in Pathology.**—A course entitled "Surgical Pathology with Special Attention to Tumors" will be offered at the University of Minnesota Medical School, Minneapolis, June 19-July 26. This is the same course that was presented at the university last summer by Dr. James S. McCartney, associate professor of pathology at the school.

## NEW JERSEY

**The Martland Lecture.**—Dr. Emanuel Libman, New York, will deliver the fifth annual Harrison S. Martland Lecture before the Essex County Anatomical and Pathological Society at the Academy of Medicine of Northern New Jersey, Newark, January 24, on "Endocarditis."

**Society News.** — Dr. Ralph Pemberton, Philadelphia, addressed the Gloucester County Medical Society, Woodbury, December 21, on arthritis.——Dr. Charles S. Prest, Brooklyn, and Mr. Philip P. Jacobs, New York, addressed the Morris County Medical Society, Morris Plains, December 21, on modern concepts of tuberculosis.

## NEW YORK

**Dr. Heyd Addresses Public Meeting.**—Dr. Charles Gordon Heyd, New York, delivered a public lecture in Rochester November 26 on "The Romance of Modern Surgery." The lecture was sponsored by the Medical Society of the County of Monroe, the Rochester Academy of Medicine and the University of Rochester School of Medicine.

**Society News.**—A symposium on Meckel's diverticulum was presented before the Rochester Pediatric Society December 8 by Drs. John Aikman, Herbert C. Soule, Howard F. Rowley and Cyril Sumner.——Dr. Frank Glenn, New York, addressed the Dutchess County Medical Society, Poughkeepsie, December 13 on "Tumors of the Large Intestine."——Dr. David D. Rutstein, Albany, N. Y., addressed the Broome County Medical Society, Binghamton, December 12 on treatment of pneumonia.

**Outbreaks of Trichinosis.**—Nine cases of trichinosis in Potsdam, St. Lawrence County, were recently reported to the state department of health following a church supper at which pork sausage was served, October 25. The pork from which the sausage was made was obtained from one person whose pigs had been fed on raw garbage.——Five persons in one family in Rochester were stricken with trichinosis during the week of December 11 after eating home-made pork sausage.

### New York City

**Personal.**—Dr. Charles F. Bolduan, director of the bureau of health education of the city department of health, was honored by his colleagues in the department November 22 with a surprise party in celebration of his thirty-fifth anniversary in public health work.——Mr. Raymond P. Sloan, associate editor of *Modern Hospital*, has been appointed to the board of trustees of the Long Island College of Medicine.

**Dinner of Euthanasia Society.**—The second annual dinner of the Euthanasia Society of America will be held January 16 at the Town Hall Club. Headquarters of the society are at 136 East Fifty-Seventh Street and the president is Clarence C. Little, Sc.D., managing director of the American Society for the Control of Cancer. Dr. Abraham L. Wolbarst is chairman of the dinner committee.

**Examination of Domestic Workers.**—The Bureau of Part Time Work, an agency which finds employment for persons who wish to work short hours, is inaugurating a movement to have domestic servants receive x-ray examination of the lungs, Wassermann tests and general physical examinations semiannually, according to an announcement. The bureau will require persons placed through its own service to have these health examinations and will urge commercial employment agencies to have their registrants tested in the same way.

**Hospital News.**—The Swedish Hospital of Brooklyn recently opened and dedicated one wing of its new home at 1350 Bedford Avenue, made possible by alteration of property owned by the hospital. The new wing has a capacity of 100 beds. There are two operating rooms. The Swedish Hospital was organized in 1906 and had extended its services until its old buildings were inadequate. Col. A. W. J. Pohl is executive officer.——Prof. Arturo Castiglioni, professor of the history of medicine, Royal University of Padua, Italy, gave a lecture at Mount Sinai Hospital December 14 on "Hippocratic Medicine and the Orientation of Modern Medical Thought."

**Physiologist Dies.**—Frederic S. Lee, Ph.D., who taught physiology at Columbia University from 1891 to 1938, died December 14 in Waverly Sanatorium, Columbia, S. C., aged 80. Dr. Lee took his doctorate at Johns Hopkins University, Baltimore, in 1885 and studied in Europe a year before becoming instructor in physiology at St. Lawrence College. From 1887 to 1891, when he joined the faculty of Columbia, Dr. Lee taught physiology and histology at Bryn Mawr College. At Columbia he was successively demonstrator in physiology, adjunct professor, Dalton professor, research professor and professor until his retirement in 1938. Dr. Lee was president of the Society for Experimental Biology and Medicine, 1908-1910, and of the American Physiological Society, 1917-1918, and was chairman of the Federation of American Societies for Experimental Biology in 1917. He was an editor of the *American Journal of Physiology* from 1898 to 1914.

**Society News.**—At a meeting of the International Spanish Speaking Association of Physicians, Dentists and Pharmacists December 15 Drs. Walter Gray Crump and Alvan L. Barach read papers on "Carcinoma of the Digestive Canal" and "Modern Treatment of Asthma" respectively.——A symposium on "Chemotherapy Including Sulfapyridine and Allied Compounds" was presented at the annual meeting of the New York Academy of Medicine January 4 by Drs. Francis G. Blake, New Haven, Conn.; Norman H. Plummer and William S. Tillett.——Dr. John F. Fulton, New Haven, among others, will address a combined meeting of the New York Neurological Society and the section of neurology of the New York Academy of Medicine January 9 on "Recent Experimental Disclosures Concerning the Functions of the Frontal Lobes."——Drs. Samuel M. Feinberg, Chicago, and Marion B. Sulzberger addressed the Medical Society of the County of Kings December 19 on "Inhalation Allergy: Recent Experiences" and "Allergic and Nonallergic Hypersensitivity as Factors in Industrial Dermatitis" respectively.——Dr. Kenneth M. Lewis addressed the New York Surgical Society December 6 on "Russell Traction in the Treatment of Fractures of the Femur—Observations on 156 Cases."——At a meeting of the New York Physical Therapy Society December 6 papers on physical medicine in peripheral vascular disease were presented by Dr. Irwin D. Stein, who discussed "Capillary Microscopy"; Dr. Samuel Silbert and Dr. William Bierman and Mae Friedlander, Ph.D., "Temperature Changes in Skin and Muscle."

## OHIO

**Personal.**—Dr. Thomas H. George, Cleveland, has been appointed a member of the State Medical Board of Ohio to succeed the late Dr. Carlyle W. Dewey, Conneaut.——Dr. Bennetta D. Titlow, Springfield, was honored with a testimonial dinner given by the Clark County Medical Society November 17 on her retirement after forty-seven years of practice. Dr. Clarence E. M. Finney, Springfield, president of the society, presided and Judge Charles B. Zimmerman of the Ohio Supreme Court was the principal speaker.——Dr. Walter H. Hartung, Toledo, former state director of health, has been appointed superintendent of the city bureau of medical relief in Toledo.

## OKLAHOMA

**Society News.**—Dr. Clarence C. Young, Shawnee, addressed the Pottawatomie County Medical Society in Shawnee November 18 on burns. Drs. Frank M. Keen and Charles F. Paramore addressed the society December 2 on "Hyperthyroidism Complicating Pregnancy" and "The Puerperium" respectively.——Dr. Henry H. Turner, Oklahoma City, addressed the Garfield County Medical Society, Enid, December 21 on "Male and Female Sex Hormones."

## OREGON

**Society News.**—Dr. Samuel G. Henricke, Portland, addressed the Coos-Curry Counties Medical Society recently on "Immunology in the Practice of Pediatrics."——Mr. R. E. Jackson, claim agent of the State Industrial Accident Commission, discussed the workman's compensation law at a recent meeting of the Polk-Yamhill-Marion Counties Medical Society.——Drs. Weston W. Heringer, McMinnville, and William T. Edmundson, Newberg, addressed the Yamhill County Medical Society, McMinnville, December 5 on "Treatment of the Failing Heart" and "Chronic Amebiasis" respectively.——Olof Larsell, Ph.D., Portland, addressed the Oregon Neuropsychiatric Society November 22 in Portland on recent developments in the study of the anatomy of the cerebellum.——Dr. Charles E. Sears, Portland, addressed the Multnomah County Medical Society, Portland, December 6 on hypertension and Dr. Kenneth G. Smith, Portland, presented a case report on nephrectomy and hypertension.

## PENNSYLVANIA

**General Reynolds to Direct Tuberculosis Control.**—Major Gen. Charles R. Reynolds, retired, recently surgeon general of the U. S. Army, has been appointed director of the division of tuberculosis control in the state department of health. To help plan an expanded program in this field the state secretary of health, Dr. John J. Shaw, announced the appointment of an advisory committee with the following members: Drs. Joseph McEldowney, John D. McLean, Louis Cohen, Charles J. Hatfield, Esmond R. Long, Burgess Gordon, Robert G. Torrey, William G. Turnbull, all of Philadelphia; Charles Howard Marcy, Pittsburgh; Charles H. Miner, Wilkes-Barre; William Devitt, Allenwood, and John H. Bisbing, Reading.

### Philadelphia

**Hospital News.**—Dr. Jacob Prager, formerly assistant director of the Jewish Hospital of Brooklyn, has been appointed medical director of Mount Sinai Hospital. Mr. Harry W. Benjamin, formerly associate superintendent of the hospital, has been made superintendent.

**Dr. Owen Appointed Director of Health.**—Dr. Hubley R. Owen, chief surgeon, medical division of the department of public safety of Philadelphia, has been appointed director of public health, succeeding Dr. Charles F. Nassau. Dr. Owen holds medical degrees from the University of Pennsylvania and Jefferson Medical College. He has been a police surgeon since 1907 and is professor of clinical surgery at the Woman's Medical College of Pennsylvania. In 1933 he was president of the International Association of Police and Fire Surgeons and Medical Directors of Civil Service Commissions of the United States.

**Society News.**—Dr. George F. Cahill, New York, addressed the Philadelphia Urological Society November 27 on "Tumors of the Adrenal Cortex Occurring in Adults."——Drs. William T. Lemmon and Stephen Dana Weeder addressed the Philadelphia Academy of Surgery December 4 on "Continuous Spinal Analgesia" and "Mesenteric Adenitis" respectively.——Dr. Warfield T. Longcope, Baltimore, addressed the Pathological Society of Philadelphia December 14 on "Cardiovascular Reactions in Glomerular Nephritis."——The committee on maternal welfare sponsored a program on "Preventive Medicine as Applied to the Avoidance of Stillbirth and Care of the Newborn" at the meeting of the Philadelphia County Medical Society December 13. The speakers were Drs. Thaddeus L. Montgomery, Ralph M. Tyson, John A. Sharkey, Emily P. Bacon, Clayton T. Beecham, Arthur First and Irving J. Wolman.

### Pittsburgh

**Society News.**—Dr. Ernest Perry McCullagh and Douglas Roy McCullagh, Ph.D., Cleveland, addressed the Pittsburgh Urological Association December 11 on "Clinical Use of Testosterone Propionate" and "Physiology of the Testes" respectively.

## SOUTH CAROLINA

**Society News.**—Drs. Francis B. Trudeau, Saranac Lake, N. Y., and Cary Eggleston, New York, addressed the Pee Dee Medical Society, Florence, November 29 on early days of the fight against tuberculosis and on diagnosis and treatment of acute failures of circulation, respectively.——Dr. William F. Rienhoff Jr., Baltimore, addressed the Columbia Medical Society of Richmond County November 13 on "Present Status of Surgical Treatment of Peptic Ulcer" and Dr. David F. Adcock, Columbia, "Blood Transfusion."

**Hospital News.**—The Oconee County Medical Society met at the Oconee County Hospital, Seneca, recently to participate in the opening of a new clinical laboratory and hospital library. Dr. Edgar R. Pund, Augusta, Ga., made an address on "The Functions and Possibilities of the Small Hospital Laboratory"; Dr. William L. Pressly, Due West, president of the state medical association, described the work of the association and Dr. Gerald E. McDaniel, Columbia, epidemiologist of the state board of health, spoke on public health aspects of scarlet fever.

## TENNESSEE

**Society News.**—Speakers at the meeting of the Dyer, Lake and Crockett Counties Medical Society, Dyersburg, December 6 were Drs. William C. Colbert on "Staphylococcic Infection"; Peter Whitman Rowland Jr., "Mechanism of Production of Clinical Irregularities of the Heart Beat," and Duane M. Carr, "Differential Diagnosis of Influenza." All are of Memphis.——Drs. John O. Manier and Duncan Eve Jr., Nashville, addressed the Madison County Medical Society, Jackson, November 7 on typhus fever and "Fractures of the Metatarsal and Phalangeal Bones" respectively.

## WASHINGTON

**Personal.**—Dr. Leland E. Powers, formerly of Port Angeles, has been appointed health officer of Tacoma. Dr. Ralph Gregg of the U. S. Public Health Service, who has been in charge of the office since the death of Dr. Samuel M. Creswell in July 1938, has been transferred to the state health department in Olympia.

**Hospital Seminar.**—The Seattle General Hospital presented its annual seminar in internal medicine December 27-29 with Dr. John Walker Morledge, Oklahoma City, as the instructor. Among the subjects of lectures were congestive heart failure, hypertension, pneumonia, geriatrics, neoplasms of the lung, chemotherapy of infection (sulfapyridine and sulfanilamide). At a staff dinner Thursday evening December 28 Dr. Morledge recounted his medical experiences as a missionary in South Africa.

**Society News.**—Drs. George R. Marshall and Armin C. Rembe, Seattle, addressed the Thurston-Mason Counties Medical Society, Olympia, November 28 on "Recent Advances in the Diagnosis and Treatment of Minor Anorectal Conditions" and "Recent Advances in Pediatrics" respectively.—— Drs. David Metheny and Kenneth K. Sherwood, Seattle, addressed the Kittitas County Medical Society, Ellensburg, November 20 on "Mortality Rates in Gastro-Intestinal Surgery" and "Treatment of Chronic Arthritis" respectively.——Dr. Joseph M. Aspray, Spokane, addressed the Spokane County Medical Society, Spokane, December 14 on "Carcinoma of the Cervix Uteri"; Dr. James T. Googe of the Farm Security Administration, on "Medical Care for the Resettlement and Migrant Family," and Mr. Jack M. Geoffrey, Seattle, on activities of the Washington State Medical Association.

## WEST VIRGINIA

**Society News.** — Dr. Isidor S. Ravdin, Philadelphia, addressed the Ohio County Medical Society, Wheeling, December 15 on "Problems in the Management of Patients with Biliary Tract Disease."

## WISCONSIN

**University News.** — Dr. Warner S. Bump, Rhinelander, addressed the convocation of the University of Wisconsin Medical School, Madison, November 23 on "Medical Opportunities in a Small Urban Community."

**Society News.**—Dr. James B. Herrick, Chicago, addressed the Medical Society of Milwaukee County December 14 on "What Not to Do in Heart Disease."——Dr. Arthur U. Desjardins, Rochester, Minn., addressed the University of Wisconsin Medical Society December 14 on "Radiation Therapy in Inflammatory Diseases."

**Personal.**—Dr. Marshall W. Meyer, formerly of Almond, has been appointed health officer of the ninth sanitary district with headquarters in Ashland.——Dr. Byron J. Hughes, assistant superintendent of the Winnebago State Hospital, Winnebago, has been appointed acting superintendent to replace Dr. Gilbert E. Seaman, who was recently made acting director of the division of mental hygiene in the new state department of public welfare.

**District Meetings.**—The First Councilor District Medical Society held its annual meeting in Beaver Dam November 12. A symposium on heart disease was presented by Drs. Harold E. Marsh and Chester M. Kurtz, Madison, and Francis D. Murphy, Milwaukee.——Speakers at the fall meeting of the Ninth Councilor District Medical Society in Wausau November 23 were Drs. Harold R. Fehland, Wausau, on "Peritoneal Vaccination for the Prevention of Peritonitis"; Eugene P. Adashek, Madison, "Thyrotoxicosis," and William D. Stovall, Madison, "Virus Diseases."

## PUERTO RICO

**Medical Association Meeting and Election.**—Dr. Oscar G. Costa-Mandry, Santurce, was elected president of the Puerto Rico Medical Association at the annual meeting December 8-10 in Santurce. Other officers elected were Drs. Eduardo R. Perez, Guayama, vice president; David E. Garcia, Rio Piedras, secretary, and Miguel F. Godreau, Guayama, treasurer. Guest speakers at the meeting were Drs. Richard A. Kern, Philadelphia, who discussed topics concerning internal medicine, and Jay Arthur Myers, Minneapolis, who discussed tuberculosis.

## GENERAL

**Trudeau School of Tuberculosis Postponed to Autumn.**—The Trudeau School of Tuberculosis, which has for many years been held in May and June, will present its 1940 session beginning September 9 and closing October 4 at Saranac Lake, N. Y., and the supplementary and optional course at Bellevue Hospital, New York, October 7-19. The change was made to avoid conflict with the annual meetings in June of the American Medical Association, the National Tuberculosis Association and the American Association for Thoracic Surgery. Enrolments are now being received and application should be made to Roy Dayton, secretary, Saranac Lake, N. Y.

**Examinations of Obstetric Board.**—The American Board of Obstetrics and Gynecology announces that the general oral and pathologic examinations (part II) for all candidates (groups A and B) will be conducted by the entire board in Atlantic City, N. J., June 8-11, immediately prior to the annual session of the American Medical Association. Application for admission to group A, part II, must be on file in the secretary's office not later than March 15. Formal notice of the time and place of the examinations will be sent to each candidate. For further information and application blanks address Dr. Paul Titus, secretary, 1015 Highland Building, Pittsburgh (6).

**Plan Pan-American Congresses of Eye and Ear Specialists.**—The American Academy of Ophthalmology and Otolaryngology at its annual meeting in Chicago in October voted to sponsor a Pan-American congress of ophthalmology in conjunction with the 1940 meeting of the academy in Cleveland October 6-11. Drs. Conrad Berens, New York, Harry S. Gradle, Chicago, and Moacyr E. Alvaro, São Paulo, Brazil, were appointed to a committee to make plans for the congress of ophthalmology. Plans are also in progress for a congress of otolaryngology to be held concurrently. The U. S. Department of State has approved and promised full support to the meetings.

**Ear, Nose and Throat Sectional Meeting.**—The annual meeting of the Southern Section of the American Laryngological, Rhinological and Otological Society will be held at the Jefferson Hotel, Columbia, S. C., January 8-9. The speakers include:

Dr. Chevalier L. Jackson, Philadelphia, Technic of Direct Laryngoscopy for Removal of Benign Tumors and Biopsy.
Dr. Lewie M. Griffith, Asheville, N. C., Unilateral Exophthalmos Due to Sinus Disease.
Dr. Leroy M. Polvogt, Baltimore, Prevention and Treatment of Deafness in Children by Irradiation.
Dr. James M. Northington, Charlotte, N. C., Relationship Between Otolaryngological Practice and Practice of Internal Medicine.
Dr. Wells P. Eagleton, Newark, N. J., A Philosophical Review of the Advances in the Treatment of Meningitis. (Meeting with the Columbia Medical Society.)
Dr. Hugh A. R. Kuhn, Hammond, Ind., Autogenous Vaccines and the Newer Chemicals in 1,000 Cases of Otitis.
Dr. James W. Babcock II, New York, Effect of Sulfanilamide in the Treatment of Acute Otitis Media.

**Society News.**—The annual meeting of the North Pacific Surgical Association was held in Vancouver, B. C., November 17-18, with Dr. Alfred T. Bazin, Montreal, as guest speaker. Dr. Bazin discussed "Jaundice—Its Interpretation and Sig-

nificance," "Cancer of the Colon and Rectum" and "The Omphalomesenteric Duct—Perils of Persistence." Dr. Robert D. Forbes, Seattle, was elected president and Dr. William M. Wilson, Portland, Ore., secretary.——Mrs. Margaret Wells Wood, Springfield, Ill., has resigned as chairman of the public health division of the General Federation of Women's Clubs, and Miss Louise Morel of the Kentucky State Department of Health, Louisville, has been appointed to succeed her. Miss Morel has been chairman of public health in the Kentucky Federation of Women's Clubs for many years.

**American Physicians Art Association.**—The annual exhibit of the American Physicians Art Association will be held at the Belmont-Plaza Hotel, New York, June 9-15, which will be during the time of the annual session of the American Medical Association in that city. The entire top floor of the Belmont-Plaza Hotel, which is across the street from the Waldorf Astoria Hotel, will be turned over to the Physicians Art Association. Space will also be provided by Mead Johnson and Company in its space in the commercial exhibit, during the American Medical Association meeting, for some of the extraordinary items in the exhibit of the American Physicians Art Association. The New York Physicians Art Club will act as host to the American Physicians Art Association. Details of the exhibit plans may be had by writing to Dr. Abraham Wolbarst, 114 East Sixty-First Street, New York, or to the president of the American Physicians Art Association, Dr. Henry N. Moeller, 327 Central Park West, New York.

**Proceedings of Congress on Microbiology.**—The Report of Proceedings of the third International Congress of Microbiology, held in New York Sept. 2-9, 1939, is in preparation and will be ready for distribution in February or March. The volume, which will have about 900 pages, will contain the lectures given at the general sessions in full, abstracts and pertinent discussions of other papers and will include information concerning the functions and membership of the congress. Only a sufficient number will be printed to cover orders actually received at the time of publication. Individuals should send the price ($5) to Kenneth Goodner, Ph.D., treasurer of the congress, Hospital of the Rockefeller Institute, York Avenue and Sixty-sixth street, New York. In the case of libraries, universities and scientific institutions, order forms will be accepted and bills will be sent at the time of delivery. Remittances from foreign countries should be in the form of a draft on a New York bank, by an international money order or in the currency of the United States.

**The Francis Amory Prize.**—The American Academy of Arts and Sciences, as trustee of a fund given by the late Francis Amory, directs attention to the Francis Amory Septennial Prize which is to be awarded in 1940. The award will be made for conspicuously meritorious work in the past seven years "through experiment, study or otherwise, in the treatment and cure of diseases and derangement of the human sexual generative organs in general and more especially for the cure, prevention or relief of the retention of urine, cystitis, prostatitis, etc." While the donor wished to reward the discovery of any new method of treatment, he expressly authorized that the prize might be given to any author who might have contributed any theoretical or practical treatise of extraordinary or exceptional value and merit on the anatomy of these organs or the treatment of their diseases. The 1940 award, which will be the first, will exceed $10,000 and may be divided at the discretion of the academy among several nominees. While formal nominations are not expected and no essays or treatises in direct competition for the prize are desired, the committee invites suggestions. Communications on this subject should reach the committee not later than May 15 and should be addressed in care of the American Academy of Arts and Sciences, 28 Newbury Street, Boston. Dr. Roger I. Lee, Boston, is chairman of the committee.

**American Doctors on Postage Stamps.**—The Postmaster General has announced the first day sale dates and colors of the thirty-five new postage stamps in the Famous American series soon to be issued by the United States Post Office Department. Among the thirty-five famous Americans to be thus honored are the names of two physicians, Dr. Crawford W. Long and Dr. Walter Reed (THE JOURNAL, Nov. 11, 1939, page 1816). The Crawford W. Long stamp will be a red 2 cent stamp, and the first day sale will be at Jefferson, Ga., April 8. The Walter Reed stamp will be a blue 5 cent stamp, and the first day sale will be at Washington, D. C., April 17.

Collectors are advised that in order to receive the official first day postmark covers must bear postage at the first class rate, whether sealed or unsealed, and allowance must be made for two 2 cent stamps on each cover of the 2 cent denomination, except those addressed for local delivery, on which 2 cents postage will suffice. The post office department requests that covers for the various sets be not forwarded to the respective first day sale houses in advance of thirty days prior to the date of first day sale. The entire thirty-five stamps of this series will be arranged vertically and printed in sheets of seventy by the rotary press from convertible electric eye plates. Each stamp will be 85/100 by 98/100 inch in size.

### Deaths in Other Countries

**Charles Vaillant,** who spent his life in x-ray research in the laboratory of the Lariboisère Hospital in Paris and suffered many amputations as a result of exposure to the rays, died in the Hotel des Invalides, Paris, December 4, aged 67. He was honored by France with the cravate of the Legion of Honor, the Prix Auddeford of 15,000 francs awarded to those injured in the pursuit of science and the gold medal of the city of Paris, and also received the Carnegie Hero Medal.

### CORRECTION

**Special Volume to Honor Dr. Schaumann.**—In THE JOURNAL, Sept. 30, 1939, page 1340, a news item announced a jubilee number of *Acta medica Scandinavica* to be published in honor of Dr. Jörgen N. Schaumann. Dr. Israel F. Holmgren, Stockholm, Sweden, editor of the Scandinavian journal, writes that the publication in honor of Dr. Schaumann will not be an issue of the journal but a separate volume made up of articles first published in the periodical. According to the original announcement, articles from the *Acta dermato-venereologica* are also to be included in the book.

## *Government Services*

### Public Health Service Officers Sent to Finland

Dr. Vance B. Murray, recently stationed in Berlin, and Dr. Herbert A. Spencer, who has been in Paris, have been dispatched by the U. S. Public Health Service to Finland at the request of the Finnish Red Cross, the New York *Times* reported December 22. It was believed that Finnish authorities feared the introduction of typhus as a result of the Russian invasion, although no information was given that the disease had broken out.

### Examination for Appointments in Army Medical Corps

The War Department announces an examination March 18-22, both dates inclusive, for appointments as first lieutenant in the Medical Corps, U. S. Army, to fill vacancies occurring during the remainder of this fiscal year. The examination is open to all male graduates of acceptable medical schools in the United States and Canada who have completed one year's internship in an approved hospital and who will not be over 32 years of age at the time it will be possible to tender a commission. Boards of officers will convene in cities throughout the United States. Full information and application blanks will be furnished on request addressed to the Adjutant General, War Department, Washington, D. C. Applications will not be considered if received in the War Department after March 2.

### Radium Loaned to Hospitals

Thirteen hospitals will receive loans of radium from the U. S. Public Health Service within the next few weeks, it was announced December 4. The grants were made in cooperation with state departments of health and cancer commissions. The terms stipulate that the institutions must make no charge to the patients for use of the radium, giving preference to those in the lowest income groups. High standards for the personnel administering the treatment are also required as a condition of the loan. The hospitals to receive the radium are: Ellis Fischel Hospital, Columbia, Mo.; El Paso City-County Hospital, El Paso, Texas; Baylor University Hospital, Dallas, Texas; Hillman Hospital, Birmingham, Ala.; St. Joseph Infirmary, Louisville, Ky.; Robert Winship Clinic, Emory University, Ga.; Greenville General Hospital, Greenville, S. C.; Tri-County Hospital, Orangeburg, S. C.; Broadlawns General Hospital, Des Moines, Iowa; Indianapolis City Hospital, Indianapolis; University of Pittsburgh; New Britain General Hospital, New Britain, Conn., and Receiving Hospital, Detroit.

# Foreign Letters

## LONDON

*(From Our Regular Correspondent)*

Dec. 2, 1939.

### Blood Transfusions During the War

Arrangements have been made for blood transfusion in the war on a scale far greater than it has ever been used before. Since the outbreak of war considerable use has been made of stored blood. Reports that stored blood has a greater tendency to produce reactions than fresh blood has caused some apprehension. The Medical Research Council, which is in charge of the storing of blood, has therefore issued a memorandum, signed by the directors of the four blood transfusion depots (located for greater safety near, instead of in, London), Drs. H. F. Brewer, M. Maizels, J. O. Oliver and Janet Vaughan. They believe that some of the reactions may have been due to faulty technic in the preparation of apparatus, withdrawal, storage or administration of blood, or the use of unduly hemolysed blood. From the emergency depots mentioned, blood has been distributed to hospitals in and near London where the methods of collection and storage have been those recommended by the Medical Research Council. The reports have been uniformly satisfactory, although one observer, while appreciating the immediate restorative use in collapsed and exsanguinated patients, suggests that the tonic and anticoagulant value is less than that of pure blood. In all 219 pints of blood were given in forty-one different hospitals to 160 patients. The maximum received by one patient was 6 pints, given as a continuous drip. The blood varied in age from a few hours to 3½ weeks. Group O was used in the majority of cases but groups A and B were provided on request. Slight rigors were produced in ten cases, but in several of these it was found that the blood had been given cold. In three cases there was transient jaundice. There was no fatality. The following points are stressed. 1. The anticoagulant solution should be prepared from freshly distilled water from a clean still, and it should be filtered and autoclaved immediately. 2. All apparatus must be scrupulously clean. A swab or elongated brush should be passed through the rubber tubing, as mere washing under the tap is not sufficient to remove adherent clot. When fresh from the manufacturers, tubing should be washed to remove the French chalk. 3. Strict surgical asepsis should be observed in collecting blood. 4. Storage should be at 2 to 4 C. 5. Blood showing undue hemolysis (extending more than 1 cm. into the citrated plasma) should not be used. 6. Corpuscles and plasma may be mixed before transfusion by as little and as gentle agitation as possible. 7. The blood should be warmed to body temperature before use, but not higher than to 104 F. The elimination of grouping errors as a cause of reaction is assumed.

### Hormone Standards

The third international conference on the standardization of hormones, held at Geneva last year, decided that international standards should be established for the hormones of the anterior pituitary and the analogous substances found in the urine and serum, and that their preparation, dispensing and storage should be undertaken by the National Institute of Medical Research, London. The first of these new standards—that for the gonadotropic substance of human urine of pregnancy—was established last May. Two others have now been prepared for the gonadotropic substance of pregnant mare's serum and the lactogenic substance of the anterior pituitary. The former standard was prepared from material provided by five manufacturing firms in four different countries, and the latter by seven firms and two research institutes in five countries. A mixture was made of the materials for the preparation of the standards, which were dispensed in the form of tablets containing 100 international units. The standard for the gonadotropic substance of pregnant mare's serum is dispensed in sealed tubes containing 25 mg. tablets. The international unit is defined as the specific gonadotropic activity contained in 0.25 mg. of the standard preparation. The standard for prolactin is dispensed in 10 mg. tablets. The international unit is defined as the specific activity contained in 0.1 mg. of the standard preparation. As in the case of the other international standards and vitamins, these standards are held on behalf of the Health Organization of the League of Nations, at the National Institute for Medical Research, London. They are thence distributed to national control centers in other countries, whence they are sent to laboratories, institutes and research workers.

### Fatal Effect of the Use of Streptococcus Toxin for Immunization Against Scarlet Fever

In the *Journal of the Royal Naval Medical Service* Surgeon-Commander O. D. Brownfield reports the case of a boy, aged 13, who with eighteen other naval cadets received his first immunizing injection of scarlet fever streptococcus toxin (500 skin test doses) at 7 p. m. There was no immediate ill effect. He turned in, as did several of the other boys, and felt rather sick—a usual occurrence after these injections. At 8:45 he was seized with acute abdominal pain. Every two or three minutes he had attacks of violent abdominal colic during which the abdominal wall became brick hard. He was pale, cold and shocked. Between the spasms of colic the abdomen appeared normal. Under warmth and rest the spasms became less frequent, and by 2 a. m. the pain had ceased and the shock was less. But by 7:30 it was obvious that ground was being lost. Coramine was given with little or no benefit. Soon afterward epinephrine (3 minims) was injected and the volume of the pulse increased for a short time. Rectal saline solution with dextrose was not retained long enough to have any effect. The resultant motion contained a good deal of mucus. During the forenoon right-sided heart failure was obvious. A repetition of the epinephrine with strophanthin had no effect. At 2:15 p. m. he collapsed, dying in a few minutes. The necropsy showed a thymus gland weighing 1¼ ounces, which was thought to confirm the diagnosis of anaphylaxis.

Surgeon-Commander Brownfield adopted immunization against scarlet fever because it enabled an attack to be treated as a mild illness and the patient returned to duty after from ten to fifteen days. The reactions were not severe and the loss of time from them was little compared with the ordinary isolation for forty-two days. But this fatality has altered Brownfield's view, as he does not think that the benefits of immunization justify risking such a tragedy, however unlikely.

## PARIS

*(From Our Regular Correspondent)*

Nov. 25, 1939.

### Racial Vitality

René Martial began his course of lectures at the Faculty of Medicine of Paris with a lecture on racial vitality and stability. He said that there is no race today, only race blends, which are the "totality of a population whose latent or manifest characteristics, particularly the characteristic of language, and whose anthropobiologic traits constitute a distinct historical unity." Race, so defined, is a psychologic, biologic and historical triangle. This definition of race is based on language, customs, historical continuity, morphology and a stability analogous to the self preservation instinct of the individual extended to include a whole population. Martial compares this stability to a ferment, slumbering at times but always present. Race is exposed partly to violent, partly to slowly acting, impacts. The former are transitional and include wars, massacres, flights, emigrations and revolutions. The latter are

more dangerous and include slavery, ethnic minorities and forced shifts of population. Race is at times in a state of mixture, one that does not end in union, any more than water and oil will unite when agitated in a glass of water.

Race is like the trunk of a tree which emerges from the ground at a given time in history and thereafter remains fixed. The moment of fixation is often lost in history. Peoples with a general distribution in a restricted geographic area and existing there from time immemorial are called "primordial" by Baschmakoff. In spite of violent upheavals and the engrafting of foreign elements, the original stock retains its unity. Martial does not think that hostile invasions annihilate races. They are less dangerous than emigrations or revolutions, for these kill the leaders. However, the real menace to race survival is not the destructive forces but those that change the character of a people. Conquests are to be feared if they introduce elements of a superior civilization; immigrations likewise, if they continue.

Blood is one of the most definite characteristics of a race, whereas the shape of the skull does not seem to be an ethnic indicator. Martial adduced numerous proofs taken from the history of several European races and of those living in other continents to support his statements. Mixed breeds tend to disappear because of the reappearance of the characteristics of their ancestral racial traits. According to Davenport, miscegenation causes disharmonies between physical and mental qualities and with the environment. There are incompatible blood strains. "Heredity shock" causes deterioration, especially mental deterioration. This accounts for the evolution of the half-breed, often a social failure and hence often an antisocial element. If a nation must admit immigrants, he said, it is indispensable that it be done under strict and continuous supervision.

### Granular Polymorphonuclears in Tuberculosis

The paper read by Raymond Benda and D. A. Uruquia before the Société médicale des Hôpitaux de Paris and based on 1,500 cases was an important contribution to the methods for the detection of tuberculosis. Granulations are present in from 98 to 100 per cent of the polymorphonuclear neutrophils. They are easy to discover. In 833 ascertained cases of tuberculosis with bacilli, granulation of polyneutrophils occurred in almost all cases (828). The five cases in which this was not observed were cases with a fibrous tendency. They were found only in four of 587 apparently normal persons. In cases of tuberculosis without bacilli, inactive for many years, observations disclosed the "doubtful" type fifty-five times. There was no clear parallelism between granulation and tuberculin tests.

## BERLIN

*(From Our Regular Correspondent)*

Nov. 18, 1939.

### The Promotion of German Pharmaceuticals

For some time efforts have been made in Germany to replace foreign medicaments with those produced at home. The reason is obvious. During the recent meeting of German druggists it was reported that great progress had been achieved in producing albumin, formerly imported in great quantities, from the serum of cattle. In the replacement of cocoa butter a new raw material, called postonal, has been created by polymerization of ethyls. Hardened walnut oil and oils obtained from the seeds of fir and pine cones are said to be successful substitutes for lard as a foundation for ointments. Aluminum is now used in Germany in place of tin for tubes and so on. Artificial caoutchouc, called buna, is much more resistant to benzine than natural rubber and can therefore often be used where natural rubber is not serviceable. Surgical gloves made of buna are said to be more durable. Special attention has been devoted to the cultivation of medicinal plants. Investigations supported by several institutions show that, by the systematic cultivation of selected kinds of peppermint, valerian, marjoram, coriander and white mustard and of other native herbs, the importation of foreign drugs can be reduced. The regions round about Berlin are to be placed under herb cultivation, use being made chiefly of uncultivated soils. The work is to be done by inmates of hospitals and sanatoriums as a form of work therapeutics. The first harvests from the present herb fields under cultivation yielded hundreds of kilograms of dry herbs. In other parts of Germany plans are being made to have children gather medicinal herbs.

The German council of economic management, a sort of governmental recruiting body for German business, recently stressed the fact that popular enlistment in the use of medicaments is not intended to encourage the buying or the permanent use of any particular drug. The council asserts that drugs are never indifferent and are of use only when taken on medical advice. The excessive use of anodynes and hypnotics is to be regarded as harmful to national life. Advertised baby foods should not engender the idea that they are as good as breast milk or a good substitute for it.

### Multiple Sclerosis

The question of multiple sclerosis was recently discussed in the meeting of neurologists and psychiatrists of southwestern Germany. Multiple sclerosis, first described clinically a hundred years ago, is one of the most frequent organic nervous diseases. A constant increase has been steadily reported of late; its cause is unknown. The first speaker, Hallervorden, of the Psychiatric Research Institute in Berlin-Buch, pointed out that there is some support for ascribing the disease to an infectious origin in the extensive inflammations discovered in the meninges. He took the point of view that in multiple sclerosis a substance injurious to the myelin exudes from the vessels as well as from the spinal fluid into the brain; he rejected the allergic theory.

Georg Schaltenbrand, neurologist, of Würzburg, said that multiple sclerosis decidedly was not hereditary, even though a certain predisposition existed. Schaltenbrand's investigations of lipases and phosphatases in the spinal fluid did not yield positive results regarding the theory of the diffusion of myelolytic toxins. Moreover, the theory of allergic reaction failed to be supported by cutaneous reactions in the Laignel-Lavastine-Koressios therapy. The interpretation of multiple sclerosis as metatuberculosis could not be entertained.

In the discussion, Paul Martini, clinician, of Bonn, said that he had tried out the Laignel-Lavastine-Koressios serum therapy on a large scale and found the results unfavorable. He never observed a complete recovery. A peculiarly subjective effect, however, of this serum therapy was observed. Martini does not regard the new French serum as specific.

### Birth Rate, Sterilization and Abortion

As previously reported, the birth rate is on the increase. This tendency has continued through the first half of 1939. One can judge of the strong propaganda pursued from the report in Goering's *National-Zeitung*, of Essen, May 2, 1939, regarding the May celebration in Berlin: "Opposite the Führer's reviewing stand, girls belonging to the girls' clubs, the counterpart of the Hitler youth, removed their jackets, the letters on their white blouses spelling the words 'We belong to you.'" This girlish affection, according to a report from Austria, was surpassed by that of women carrying a transparency during a parade with the inscription "Leader, at thy command we will bear thee children."

The supervision exercised over physicians because of the practice of abortions occasionally leads to unjustified arrests in Germany. A gynecologist in Brunswick, 38 years old, had been arrested in November 1935 because he sterilized women without medical necessity. He was acquitted in January 1937 but the judgment was revoked. In July 1938 he was condemned to four years in the penitentiary and prohibited from

practicing his profession for five years. On orders of the supreme courts of the reich the case was reexamined. After a trial of ten days he was acquitted. He had been in custody for almost two years. The attorney general has now accepted the verdict, making the decision final.

### Promoting Pulchritude Under Naziism

Recently Dr. Ley, state director of organizations, dedicated the "House of Beauty Culture" in Berlin. Selections are to be made from barbers and "beauty parlor" assistants for special training in promoting pulchritude. In his address Ley said that it was Hitler's great accomplishment to accustom the people again to a sense of what the beautiful really is. He defined the term "beautiful" in these words: "What benefits me and my people is beautiful, whatever makes me weak or ill is ugly" as an esthetic criterion. Furthermore, he said, "party affiliation and the army are the institutes of beauty for men. In the case of women, many things are still lacking to secure charm and gracious living to them. We do not want the athletic type of woman, neither do we want the Gretchen type."

### Photography of the Bladder

Endoscopic pictures made so far have proved unsatisfactory, partly because they have been so small. Projections on a large scale are difficult to make. For this purpose the opening has to be enlarged so that, under magnification, the same visual field is presented which one has in direct endoscopic observations. Dr. A. Gütgemann, of the University of Bonn, uses a Leica employing the normal mirror reflex arrangement, an intermediate optical device constructed on the analogy of the usual micro-arrangements and a photocystoscope. The diameter thus attained amounted to 18.5 mm. The colored cystoscopic views obtained satisfy the requirements as to clearness, distinct outline and color reproduction and offer the possibility of fixing and controlling objective observations.

The colored single view is no longer satisfactory, since it cannot represent the movements of the walls of the bladder as they appear in endoscopic examinations. Cinematography is the key to this problem. Through further development of cystoscopic lamps, adjustment of picture frequency and the use of specially constructed cameras, the interior of the bladder can be viewed cinematographically. Dr. Gütgemann has already made such films showing specimens both of the normal and of the pathologic activity of the ureter; also hematurias, varicose vascular enlargements in a papilloma, urinary calculi and ureteral methylene blue excretions.

### Postgraduate Medical Training

Dr. E. Kittler spoke before the Medical Society of Berlin on the principles that should govern the production of films intended for the postgraduate training of physicians. Subjects selected for such films should be taken especially from the field of minor and major operations and must be chosen so that the outlook of the general practitioner with regard to therapeutic possibilities is enlarged. The effects and the success of surgical operations are more important in films than the showing of surgical technic. Minor gynecologic views and obstetric demonstrations are important also. The field of internal medicine has not yet been opened up to film production as it should be. Films, he said, could promote the diagnostic knowledge of the physician. A characteristic remark was "The widened sphere of duties demands of the German physician an increased knowledge in fields which the national socialist way of interpreting the world (weltanschauung) was the first to introduce." He proposed as supplementary film subjects those that dealt with heredity and heredity cultivation, with the synthesis of medicine taught in the schools and that taught by nature and with views of processes that deal with the vital needs of factory employees at work.

### Tuberculous Patients and Air Raids

THE JOURNAL, May 6, page 1845, reported measures taken to protect hospitals in air raids. The state department for aviation jointly with the department of the interior has released the following regulations: "Patients with an actively infective pulmonary tuberculosis are not to enter stations set aside for air protection whenever air raid drills are practiced. All other patients with pulmonary tuberculosis capable of spreading infection are to be exempted from seeking air raid shelters when air raid drills are ordered. 'Carriers' of typhus, paratyphus and dysentery may remain in air raid shelters only for a short time."

## ITALY

*(From Our Regular Correspondent)*

Nov. 15, 1939.

### Surgical Treatment of Chronic Cystitis

Professor Pieri, in a lecture before the Società Medica of Friuli, reported his method for the surgical treatment of painful chronic cystitis. He proposed, in 1926, resection of the presacral nerve through which motor and sensory nervous fibers reach the bladder. Section of the nerve causes hypesthesia of the mucosa of the bladder, decreases the action of the sphincter and reinforces that of the detrusor muscular fibers of the bladder with consequent easy emptying of the bladder. The speaker has resorted to the procedure in fifteen cases, and the subjective disturbances were improved in all but two. In the two cases in which treatment failed, death occurred from bronchopneumonia and tuberculous meningitis, respectively.

### Extrahepatic Echinococcus Cysts

Professor Businco, in a lecture recently delivered to the Società di Gastro-enterologica of Rome, classified certain types of extrahepatic echinococcus cysts in the following groups: (1) hydatid cysts of either the mouth, the fauces, the salivary glands or the tonsils, (2) those of the pharynx, esophagus, cervical lymph nodes and thyroids, (3) those of the esophagus and periesophagus in the thorax and (4) of intra-abdominal, pelvic peritoneal and retroperitoneal development. In the larger number of cases the pathogenesis is hematogenic. Echinococcosis of the lung, secondary to that of the digestive tract, takes place either through the lymphatics or through the inhalatory route. Professor Gamberini reported a case of echinococcosis of the pancreas with compression of the bile ducts.

### Malignant Granuloma of Digestive Tract

Drs. Gamna and Pino, in a lecture recently delivered to the Società Gastro-enterologica of Rome, discussed malignant granuloma of the digestive tract. The first Italian case of malignant granuloma of the intestine was reported twenty years ago by Professor Gamna, of Turin University. Gamna's description contributed to the general acceptance of malignant granuloma of the intestine as a disease in itself. Many cases have since been reported. Malignant granuloma of the intestine is a clinical form of malignant granuloma of the abdominal structures, the three clinical forms of which are the gastrointestinal, retroperitoneal and hepaticosplenic. The majority of cases of malignant gastrointestinal granuloma which have been reported were advanced cases. The type of the lesion may be either ulcerative or tumoral. The lesions of either the ulcerative or the tumoral forms are multiple in both the stomach and the intestine. Gastrointestinal malignant granuloma shows an early involvement of the adjacent lymph nodes. A microscopic study of the involved gastrointestinal structures shows that the disease originates in the mucosa and infiltrates the other layers of the gastrointestinal walls. The main clinical symptoms are (1) meteorism, local pain and disturbances of digestion and defecation and (2) anemia, loss of weight and sometimes fever and cutaneous manifestations. Late in the

development of the disease a segment of the gastrointestinal tract is predominantly involved and the clinical forms can be differentiated into esophageal, gastric or intestinal. The differential diagnosis is made with gastrointestinal tuberculosis, tumors, gastric syphilis, amebiasis and actinomycosis of the cecum or of the stomach. The prognosis was considered up till now as fatal, regardless of the treatment that was resorted to. The speakers emphasized the importance of early diagnosis and the value of early surgical intervention, which gives satisfactory results if made while the disease is still restricted to a given local area.

### Society Reunion

The Società Medico-Chirurgica of Pavia met recently. Professor Bignami discussed the diagnostic value of lymphography, by which the most minute details of the lymphatic system can be observed. The speaker used thorium dioxide sol as a contrast substance. The subcutaneous route gives satisfactory results, provided the injection is made under pressure in compact tissues containing branches of the main lymphatic vessels, such as the tips of the fingers. The best results are obtained by making the injection into the lymph nodes. By this technic the morphology of the nodes can be studied and the afferent and efferent lymphatic channels can be visualized.

Professor Leinati discussed the influence of scars in the development of experimental tumors. He made applications of a 1 per cent oily solution of benzopyrene or methylcolantrene on the skin of rats. He found that tumors from application of the solution develop more rapidly and in a larger percentage of cases when the solution is applied on malformed scars than on either normal skin or healing ulcers.

Professor Donati reported a study of various methods commonly resorted to for the diagnosis of the functions of the kidneys. He made observations in several cases of closed trauma of the kidney and found that chromocystoscopy and catheterization of the ureters are the procedures of more value than any others for diagnosing the functioning of traumatized kidneys. Descending pyelography may give erroneous results but can be resorted to either when other functional tests cannot be performed or as a complementary test to other functional tests. It is advisable to resort systematically to descending pyelography during the first few hours which follow renal trauma, as the test is harmless and simple.

### Treatment of War Wounds

Prof. Nicola Leotta, head of the Clinica Chirurgica of Palermo, lectured recently before the physicians of the army in Palermo on surgical treatment of war wounds. At the outbreak of the World War the predominant criterion of treatment of wounds was that of expectation after disinfecting the wound. Disinfection was carried out at first aid stations on the front line, after which the wounded were transferred to hospitals farther back. Frequently infection developed. A large number of soldiers, even those wounded in the limbs, were lost as fighting units because of the long evolution of the wounds after infection. As the knowledge of modern war wounds developed, the criteria for the treatment of wounds changed and surgical centers were organized. Bacteriologic and clinical researches showed that bacteria enter almost all wounds, although infection, devitalization of tissues and toxemia did not immediately develop. If there is ample surgical removal (exeresis) of the involved tissues during the safe period, infection is prevented or at least attenuated. The period between the time of the wound and the operation should be very short in abdominal and thoracic wounds and little longer in cranial wounds. The eight hour limit can be extended sometimes without risk. However, far from certain time limits the treatment which is based on surgical asepsis (and by which an immediate or almost immediate suture can be made) cannot be resorted to because of the presence of infection. Definite treatment of wounds with cavitation is a task of expert surgeons. The speaker gave the details of the treatments which can be resorted to in thoracic wounds (either closed or in communication with external surfaces) and also in abdominal wounds. The criterion that surgical intervention is the only hope in abdominal wounds has to be followed. The earlier the operation, the greater the probabilities of success. Of soldiers with abdominal war wounds, the speaker had 60 per cent of recoveries in the group who had the operation during the first four hours after occurrence of the wound, 50 per cent in the group of those who had the operation during the first six hours and 10 per cent in the group who had it between eight and twelve hours. The operation consists in removal of all tissues which have been in contact with the bullet and foreign material and immediate primary suture of the wound, if the operation is performed in the course of the first six hours, or otherwise, open treatment with peritoneal drainage. The speaker discussed the complicated problem of logistics in relation to surgical treatment of war wounds with cavitation.

### Health and Social Insurance

Modern Italian social insurance covers both insured workers and their families. Insurance against tuberculosis, which became effective ten or twelve years ago, has at present more than 20 million insured persons. It has now fifty-one hospitals, and twelve more are under construction. Hospital care was given during 1938 to 46,512 persons with a total number of 9,870,663 days of hospital care, 3,310,979 of which were days given to members of families of those insured. In the course of the first ten years of the insurance center 309,166 patients had hospital care given by the insurance center with 57,000,000 days of hospitalization. The centers of insurance against invalidism had increased the number of stations for care of convalescent patients, dispensaries against trachoma and centers against adenoidism. During 1938, climatic treatments at stations of mineral waters were given to 24,294 insured workers with a stay of fifteen consecutive days for each patient. In the last ten years 108,669 patients had had care at the stations. In this number were 45,273 women and more than 15,000 children. A center for convalescents was recently opened in Bologna and another will soon open in Naples.

Antitrachoma centers treat either insured or uninsured patients. In 1938, 35,327 persons were cared for. There are twenty-one centers for consultation of working mothers in various cities. In 1938, 12,435 mothers received medical care or were given medical advice. In the last ten years, 81,649 working mothers visited the centers for consultation.

## *Marriages*

RODERICK F. MACDOUGAL, Cedar Rapids, Iowa, to Miss Mildred Greaves, of Sherman Mills, Maine, Nov. 4, 1939.

BENJAMIN V. KAUFMAN, Carbondale, Pa., to Miss Eleanor Klein, of Scranton, at Fort Worth, Texas, Oct. 10, 1939.

JAMES WILKINSON JERVEY to Mrs. Maude Earle Hammond Lewis, both of Greenville, S. C., in October 1939.

EDWARD STARR MORRIS, Philadelphia, to Miss Jane Havens Shannonhouse, of Merchantville, N. J., recently.

ROYCROFT C. JONES, Philadelphia, to Mrs. Carolyn P. Atkinson, of West Oak Lane, Pa., Nov. 15, 1939.

WILLIAM H. WRIGHT to Miss V. Ruth Emmerson, both of Chicago, in Bellwood, Ill., Aug. 4, 1939.

CYRIL LEWIS HYATT, Little Rock, Ark., to Miss Wanda White, of Van Buren, Nov. 5, 1939.

ALBAN PAPINEAU to Miss Jeanette Edwards, both of Plymouth, N. C., Aug. 30, 1939.

ROBERT H. GROH to Miss Pauline Satterwhite, both of Washing, D. C., in October 1939.

# Deaths

**Isidor Harrison Tumpeer** ✠ Chicago; Rush Medical College, Chicago, 1916; formerly clinical assistant in pediatrics at the Northwestern University Medical School; senior lieutenant in the U. S. Navy during the World War; member of the American Academy of Pediatrics; president-elect of the Chicago Society of Allergy; aged 46; chief of staff of the pediatric department and head of the children's allergy department at the Michael Reese Hospital, where he died, Nov. 29, 1939, of hypertension and heart disease.

**John Rogers,** New York; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1891; member of the Medical Society of the State of New York; professor of clinical surgery emeritus, Cornell University Medical College, and professor from 1909 to 1920; fellow of the American College of Surgeons; consulting surgeon to the Bellevue, Booth Memorial, Memorial and St. Francis hospitals, and Hospital for the Ruptured and Crippled; aged 73; died, Nov. 19, 1939.

**Edgar Allen Pray,** Valley City, N. D.; University of Pennsylvania Department of Medicine, Philadelphia, 1894; member of the House of Delegates of the American Medical Association, 1920, 1922, 1923, 1925, 1927 and 1928; member and past president of the North Dakota State Medical Association; past president of the North Dakota Anti-Tuberculosis Association; fellow of the American College of Surgeons; aged 71; died, Nov. 16, 1939, in a hospital at Fargo of cerebral hemorrhage.

**Jacob Ambrose Storck** ✠ New Orleans; Medical Department of Tulane University of Louisiana, New Orleans, 1893; at one time professor of diseases of the digestive system and professor of gastro-enterology emeritus at the Tulane University Graduate School of Medicine (New Orleans Polyclinic); served at various times and in various capacities on the staffs of the Charity Hospital and the Eye, Ear, Nose and Throat Hospital; aged 73; died, Nov. 16, 1939.

**Milo Wilson,** Gallipolis, Ohio; Ohio Medical University, Columbus, 1896; member of the Ohio State Medical Association; member of the Radiological Society of North America; formerly secretary of the Gallia County Medical Society; served at various times on the staffs of the Ohio Hospital for Epileptics and the Athens (Ohio) State Hospital; on the staff of the Holzer Hospital; aged 68; died, Nov. 9, 1939.

**Howard Tennyson Child,** Bristol, Maine; Jefferson Medical College of Philadelphia, 1909; served with the U. S. Navy during the World War; at one time permanent subdistrict medical officer of the local office of the U. S. Veterans' Bureau, Burlington, Vt.; formerly clinical director of the New Hampshire Hospital for the Insane, Concord; aged 55; died, Nov. 5, 1939.

**John Algernon Cavanaugh** ✠ Chicago; College of Physicians and Surgeons, School of Medicine of the University of Illinois, 1904; member of the American Academy of Ophthalmology and Otolaryngology; fellow of the American College of Surgeons; formerly on the staff of St. Luke's Hospital; aged 60; died, Nov. 17, 1939, of metastatic carcinoma of the brain.

**Collin Foulkrod** ✠ Philadelphia; Jefferson Medical College of Philadelphia, 1901; assistant professor of obstetrics at his alma mater; member of the American Gynecological Society; fellow of the American College of Surgeons; past president of the Philadelphia Obstetrical Society; on the staff of the Presbyterian Hospital; aged 65; died, Nov. 16, 1939.

**Edward Karl Allis,** North Little Rock, Ark.; Hahnemann Medical College and Hospital, Chicago, 1905; Indiana University School of Medicine, 1908; member of the American Psychiatric Association; on the staff of the Veterans Administration Facility; served during the World War; aged 58; died, Nov. 25, 1939.

**Herman Bryden Allyn** ✠ Philadelphia; University of Pennsylvania Department of Medicine, Philadelphia, 1885; fellow of the American College of Physicians; past president of the Philadelphia County Medical Society; on the staff of the Philadelphia General Hospital; aged 79; died, Nov. 6, 1939.

**Hugh Alexander Stewart,** Flint, Mich.; Detroit College of Medicine, 1906; member of the Michigan State Medical Society; at one time state senator, member of the board of education and state board of registration in medicine; aged 57; died, Nov. 25, 1939, of coronary occlusion and myocarditis.

**W. Edwards Schenck** ✠ Cincinnati; Miami Medical College, Cincinnati, 1891; fellow of the American College of Surgeons; served during the World War; aged 78; died, Nov. 26, 1939, in the Christ Hospital of arteriosclerosis, myocarditis, hemiplegia and prostatic hypertrophy.

**Smith Owen Dexter** ✠ New York; Harvard Medical School, Boston, 1933; research fellow on the staff of the Memorial Hospital for the Treatment of Cancer and Allied Diseases; aged 32; died, Nov. 26, 1939, in Annapolis, Md., of coronary occlusion and sclerosis.

**Antonio Gentile** ✠ Newport News, Va.; University of Virginia Department of Medicine, Charlottesville, 1927; fellow of the American College of Surgeons; aged 36; on the staff of the Elizabeth Buxton Hospital, where he died, Nov. 16, 1939, of coronary occlusion.

**Francis James Murray** ✠ New York; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1894; veteran of the Spanish-American War; formerly police surgeon; aged 66; died, Nov. 16, 1939, of heart disease.

**George Flamm** ✠ Brooklyn; Long Island College Hospital, Brooklyn, 1916; served during the World War; on the staffs of the Roosevelt, Cumberland, Beth Moses and Greenpoint hospitals; aged 45; died, Nov. 27, 1939, in the Brooklyn Hospital.

**Frederic Joseph Peirce,** Pueblo, Colo.; Harvard Medical School, Boston, 1898; member of the Colorado State Medical Society; served during the World War; past president of the Pueblo County Medical Society; aged 65; died, Nov. 15, 1939.

**Joseph Whitefield Smith** ✠ Bloomington, Ill.; Keokuk (Iowa) Medical College, 1891; fellow of the American College of Surgeons; aged 76; on the staff of the Brokaw Hospital, where he died, Nov. 19, 1939, of pneumonia and heart disease.

**Norman Bethune,** Montreal, Que., Canada; University of Toronto Faculty of Medicine, 1916; member of the American Association for Thoracic Surgery; served during the World War; aged 49; died, Nov. 25, 1939, in China of septicemia.

**Henry Rudolph Roether,** Perrysburg, Ohio; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1893; formerly mayor, and member of the board of education; aged 72; died, Nov. 13, 1939, of cerebral hemorrhage.

**John Howard Buchanan** ✠ Memphis, Tenn.; University of Tennessee Medical Department, Memphis, 1932; aged 33; died, Nov. 8, 1939, in the King's Daughters Hospital, Greenville, Miss., of injuries received in an automobile accident.

**Henry Rupert Derome,** Montreal, Que., Canada; McGill University Faculty of Medicine, Montreal, 1912; member of the American Association for Surgery of Trauma; on the staff of St. Luke's Hospital; aged 57; died, Nov. 15, 1939.

**Edmund Warner Fisher** ✠ Brooklyn; Cornell University Medical College, New York, 1925; aged 44; on the staffs of St. John's Hospital and the Peck Memorial Hospital, where he died, Nov. 29, 1939, of rheumatic heart disease.

**Edward Conway Maphis,** Mardela Springs, Md.; University of Virginia Department of Medicine, Charlottesville, 1926; served during the World War; aged 41; was found dead, Nov. 15, 1939, of an overdose of sleeping potion.

**Lewis Nelson Eames** ✠ Rome, N. Y.; University of Buffalo School of Medicine, 1905; for many years health officer of Rome; on the staff of the Rome Hospital and Murphy Memorial Hospital; aged 58; died, Nov. 16, 1939.

**James Wilson Cassell** ✠ New York; Bellevue Hospital Medical College, New York, 1889; on the staffs of the Manhattan Eye, Ear and Throat Hospital and the Knickerbocker Hospital; aged 76; died, Nov. 4, 1939.

**Robert Cooke Bicknell,** Washington, D. C.; Vanderbilt University School of Medicine, Nashville, Tenn., 1892; Jefferson Medical College of Philadelphia, 1895; aged 77; died, Nov. 16, 1939, of arteriosclerotic heart disease.

**John H. Masterson,** Leighton, Ala.; University of Louisville (Ky.) Medical Department, 1889; aged 80; died, Nov. 16, 1939, in the Eliza Coffee Memorial Hospital, Florence, of shock and a fractured hip received in a fall.

**Ernest Eugene Wands,** Lisbon, N. D.; Keokuk (Iowa) Medical College, College of Physicians and Surgeons, 1906; served during the Spanish-American and World wars; aged 63; died, Nov. 19, 1939, in Tampa, Fla.

**John Welton Fisher,** Milwaukee; Rush Medical College, Chicago, 1877; for many years medical director of the Northwestern Mutual Life Insurance Company; aged 91; died, Nov. 25, 1939, in Detroit of pneumonia.

**Morgan Dillon Baker** ✠ San Jose, Calif.; University of California Medical Department, San Francisco, 1904; member of the Radiological Society of North America; aged 59; died, Nov. 13, 1939, of heart disease.

**Edward Thomas Wetzel** ✠ West Union, W. Va.; Baltimore Medical College, 1903; county health officer; served at various times on the board of education; aged 67; died, Nov. 4, 1939, of cerebral hemorrhage.

**William C. Haltom,** Jonesboro, Ark.; Memphis (Tenn.) Hospital Medical College, 1900; member of the Arkansas Medical Society; aged 70; died, Nov. 19, 1939, of mitral regurgitation and chronic nephritis.

**Edwin Lincoln Winslow,** Danville, Ill.; University of Wooster Medical Department, Cleveland, 1892; served during the World War; aged 74; died, Nov. 10, 1939, in a local hospital of heart disease.

**William Wesley Bartine,** Aberdeen, Wash.; Northwestern University Medical School, Chicago, 1898; member of the Washington State Medical Association; aged 73; died, Nov. 2, 1939, of melanotic sarcoma.

**Anne R. L. Caffrey,** Philadelphia; Woman's Medical College of Pennsylvania, Philadelphia, 1911; medical inspector for the board of education; aged 67; died, Nov. 12, 1939, in the Woman's Hospital.

**Lyle Bryan Durkee,** Abercrombie, N. D.; Rush Medical College, Chicago, 1939; aged 25; intern at the Illinois Central Hospital, Chicago; was killed, Nov. 20, 1939, when struck by an automobile.

**Henry P. Wadsworth,** Chicago; Rush Medical College, Chicago, 1889; also a dentist; served during the World War; aged 73; died, Nov. 20, 1939, in Geneva, Ill., of poison, self administered.

**Floyd Victor Efferding,** Chicago; Washington University School of Medicine, St. Louis, 1924; served during the World War; aged 42; died, Nov. 26, 1939, in the Henrotin Hospital of meningitis.

**Nicholas Anderson Wood,** Denver; Marion-Sims College of Medicine, St. Louis, 1893; served during the World War; aged 72; died, Nov. 2, 1939, in St. Luke's Hospital of gastric hemorrhage.

**Francis Oliver Darby,** Baton Rouge, La.; Maryland Medical College, Baltimore, 1905; member of the Louisiana State Medical Society; aged 61; died, Nov. 12, 1939, of coronary occlusion.

**Benjamin Thomas Smith,** Newburg, Mo.; Barnes Medical College, St. Louis, 1897; member of the Missouri State Medical Association; aged 76; was killed, Nov. 20, 1939, in an automobile accident.

**Sydney Allen Lowry,** Kings Mountain, N. C.; Memphis (Tenn.) Hospital Medical College, 1900; aged 75; died, Nov. 6, 1939, in a hospital at Shelby of enterocolitis and chronic duodenal ulcer.

**John Francis Leo Killoran,** Toronto, Ont., Canada; University of Toronto Faculty of Medicine, 1904; aged 60; on the staff of St. Michael's Hospital, where he died, Nov. 17, 1939.

**Fillmore Young,** Marion, Ohio; Starling Medical College, Columbus, 1892; member of the Ohio State Medical Association; aged 69; died, Nov. 20, 1939, of cerebral hemorrhage.

**Joseph Louis Amorose,** Galva, Ill.; Loyola University School of Medicine, Chicago, 1931; aged 40; was found dead, Nov. 30, 1939, of an overdose of a sleeping compound.

**William Burdett Batchelder,** Boston; Harvard Medical School, Boston, 1894; aged 68; died in November 1939 when a hot water heater exhausted the supply of oxygen.

**Frank Henry Raab** ✠ Kansas City, Mo.; University of Pennsylvania Department of Medicine, Philadelphia, 1910; aged 52; died, Nov. 15, 1939, of coronary thrombosis.

**James Naismith,** Lawrence, Kan.; Gross Medical College, Denver, 1898; member of the Kansas Medical Society; aged 78; died, Nov. 28, 1939, of a cerebral hemorrhage.

**Thomas Reid Mellard,** Asheville, N. C.; Tulane University of Louisiana School of Medicine, New Orleans, 1921; aged 42; died, Nov. 8, 1939, of pulmonary tuberculosis.

**James K. Moss,** Indianapolis; Medical College of Indiana, Indianapolis, 1885; at one time coroner of Clay County; aged 82; died, Oct. 24, 1939, of cardiorenal disease.

**Rupert Le Roy Savage,** Rocky Mount, N. C.; University of Maryland School of Medicine, Baltimore, 1897; aged 65; died, Nov. 15, 1939, of coronary thrombosis.

**James Ignatius Murray** ✠ Detroit; Cleveland Medical College, 1895; formerly on the staff of the Grace Hospital; aged 67; died, Nov. 20, 1939, of coronary occlusion.

**Kirk Shawgo** ✠ Quincy, Ill.; Rush Medical College, Chicago, 1903; on the staff of the Blessing Hospital; aged 64; died, Nov. 2, 1939, of coronary thrombosis.

**Francis Chalffee Dickinson,** Galesburg, Ill.; Chicago Homeopathic Medical College, 1893; aged 71; died, Nov. 19, 1939, in the St. Francis Hospital, Peoria.

**Thomas J. Collins,** Griffin, Ga.; Georgia College of Eclectic Medicine and Surgery, Atlanta, 1885; Confederate veteran; aged 89; died, Oct. 26, 1939, of senility.

**John A. Miller,** Hamilton, Ill.; College of Physicians and Surgeons, Keokuk, Iowa, 1881; aged 84; died, Nov. 16, 1939, of chronic myocarditis and arteriosclerosis.

**George J. Aloucos,** Providence, R. I.; National University of Athens School of Medicine, Greece, 1922; aged 42; died, Nov. 18, 1939, of coronary thrombosis.

**Duncan Albert Dobie,** New York; Victoria University Medical Department, Coburg, Ont., Canada, 1887; aged 80; died, Oct. 23, 1939, of coronary thrombosis.

**Magnus Eli Conaway,** Monroe, N. C.; Vanderbilt University School of Medicine, Nashville, Tenn., 1888; aged 71; died, Nov. 4, 1939, of chronic myocarditis.

**Alfred B. Penton,** Oxford, Mich.; Michigan College of Medicine and Surgery, Detroit, 1896; aged 71; was killed, Nov. 13, 1939, in an automobile accident.

**Ignatius Colletti-Reina,** New York; Regia Università degli Studi di Palermo, Facolta di Medicina e Chirurgia, Italy, 1893; aged 68; died, Oct. 29, 1939.

**Otto C. Aichner,** Erie, Pa.; Baltimore University School of Medicine, 1894; formerly a druggist; aged 65; died, Nov. 13, 1939, of coronary thrombosis.

**Carroll Booker,** Bogota, Ill.; Homeopathic Medical College of Missouri, St. Louis, 1884; aged 87; died, Nov. 16, 1939, in Newton of chronic nephritis.

**Thomas J. Conaway,** Barrackville, W. Va.; American Eclectic Medical College, Cincinnati, 1894; also a druggist; aged 76; died, Nov. 7, 1939.

**Otto L. Rohlfing,** St. Louis; Missouri Medical College, St. Louis, 1896; aged 64; died, Nov. 14, 1939, of chronic myocarditis and hypertension.

**Eugene Brezany,** St. Louis; Uniwersytet Jagiellonski Wydzial Lekarski, Cracow, Austria, 1897; aged 68; died, Nov. 16, 1939, of myocarditis.

**Henry B. Stephens,** Memphis, Tenn. (licensed in Tennessee in 1889); aged 78; died, Nov. 3, 1939, of cerebral hemorrhage and arteriosclerosis.

**William T. Nunn,** Halls, Tenn.; University of Louisville (Ky.) Medical Department, 1888; bank president; aged 73; died, Nov. 3, 1939.

**Thomas Boyd Ellis Beall,** Columbus, Ohio; Pulte Medical College, Cincinnati, 1883; aged 81; died, Nov. 2, 1939, of coronary thrombosis.

**William Campbell Weekes,** St. Petersburg, Fla.; University of the City of New York Medical Department, 1892; died, Nov. 18, 1939.

**John Joseph Condrick,** Brockton, Mass.; University of Vermont College of Medicine, Burlington, 1911; aged 53; died, Nov. 10, 1939.

**William E. Taylor,** Mammoth, W. Va.; University of Louisville (Ky.) Medical Department, 1913; aged 57; died, Oct. 30, 1939.

**D. Richard Waddle,** Greenville, Texas; University of Tennessee Medical Department, Nashville, 1896; aged 69; died, Nov. 2, 1939.

**Peter Weimar Fischer,** Denver; Colorado School of Medicine, Boulder, 1891; aged 80; died, Nov. 19, 1939, of coronary thrombosis.

**Ellis W. Hall,** Attica, Ohio; Starling Medical College, Columbus, 1885; aged 75; died, Nov. 19, 1939, of myocarditis and pneumonia.

**James Melvin Park,** Hamilton, Ont., Canada; University of Toronto Faculty of Medicine, 1903; aged 64; died, Nov. 12, 1939.

**Micajah Haynes,** Vinita, Okla.; Atlanta Medical College, 1877; aged 88; died, Oct. 29, 1939, of cerebral arteriosclerosis.

**Tilon Vance Moore,** Delco, N. C.; Baltimore Medical College, 1901; aged 62; died, Nov. 14, 1939, of coronary thrombosis.

**Edward Hugo Shields,** St. Louis; Miami Medical College, Cincinnati, 1892; aged 73; died, Nov. 11, 1939, of heart disease.

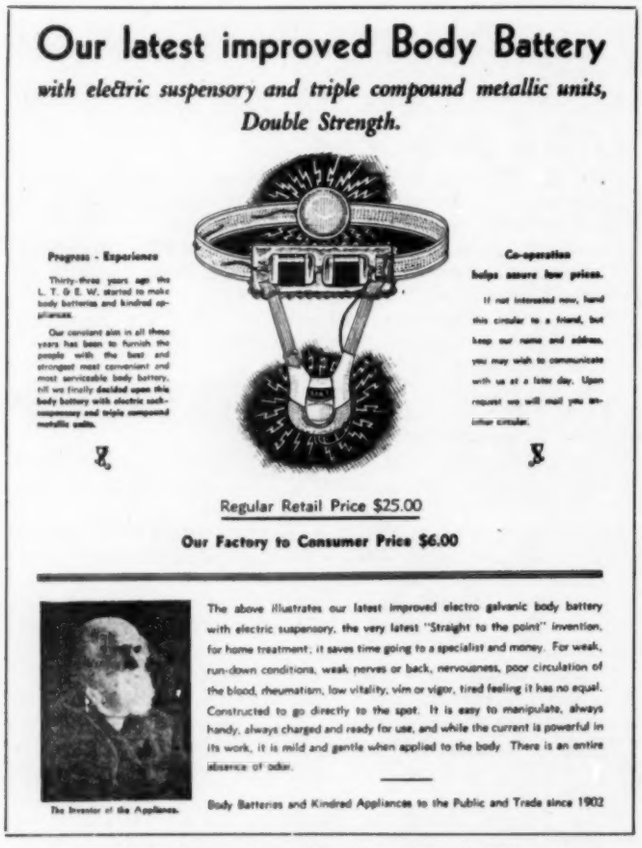
# Bureau of Investigation

## ANOTHER FRAUDULENT "ELECTRIC BELT"

### Lorenz Device, with "Electric" Suspensory, Debarred from the Mails

Another "electric belt," long promoted for the cure of weakness in men, has been debarred from the mails through the issuance of a Post Office fraud order against the Lorenz Truss and Electric Works, The Electra Vita Company and D. Lorenz, all of Chicago.

For many years the Lorenz concern advertised its device as the "Famous Dr. Lorenz Electro Body Battery." In later years, what seems to have been about the same thing with a suspensory attachment added has been sold as the "Electric Body Battery and Suspensory." Though a form letter sent out in 1935 bore a picture of a man wearing only this device


Our latest improved Body Battery
with electric suspensory and triple compound metallic units, Double Strength.
Progress - Experience
Co-operation helps assure low prices.
Regular Retail Price $25.00
Our Factory to Consumer Price $6.00
The above illustrates our latest improved electro galvanic body battery with electric suspensory, the very latest "Straight to the point" invention, for home treatment; it saves time going to a specialist and money. For weak, run-down conditions, weak nerves or back, nervousness, poor circulation of the blood, rheumatism, low vitality, vim or vigor, tired feeling it has no equal. Constructed to go directly to the spot. It is easy to manipulate, always handy, always charged and ready for use, and while the current is powerful in its work, it is mild and gentle when applied to the body. There is an entire absence of odor.
The Inventor of the Appliance.
Body Batteries and Kindred Appliances to the Public and Trade since 1902

Some of the Lorenz advertising (reduced) received in 1935.

and designated "Trade Mark since 1902," the company's early letterheads bore, under the words "Trade Mark," a picture of a long haired, heavily bearded individual with flowing tie, designated "D. Lorenz." This may have been the same person listed nearby as "Dr. Lorenz, Manager," and included among the names of the three "Founders." Neither the medical directories of that period nor the current ones list a D. Lorenz of Chicago as a doctor of medicine.

Certainly the Lorenz outfit would not let the public confuse its device with the ordinary "electric belt" that was widely advertised some twenty-five years ago. In its literature around that time the concern claimed: "The Dr. Lorenz Electro Body Batteries are the only ones in the market which have the special feature of working without constantly being charged with vinegar or acids or have the patented anti-short rheostat." (At that, it would be nice to be able to turn the thing off if one suddenly smelled scorched skin or burning clothes.)

Typical of the advertising buncombe of that period were other Lorenz blurbs:

> "Electricity puts new life, strength, vim, vigor and courage in the entire system; it vitalizes the blood, increases the circulation, gives strength and energy to every nerve, muscle and bone; it makes one feel young and ambitious . . ."

As for the Lorenz battery itself, it was

> "Guaranteed to give 300% greater service and . . . 400% easier applied than the old style vinegar, so-called health-belts . . . It sends a stream of vital life into your nerves, organs and blood during the time you are asleep. For the treatment of rheumatism, weak back, nervousness, stomach, liver and kidney disorders, varicocele and losses it is incomparable . . ."

What more, indeed, could the suffering ask? Nor was it only to "weak men" that Lorenz made his appeal, for one of his booklets after extolling the belt's alleged value to that sex introduces a section under "Female Complaints" with comment beginning:

> "The wonderful influence of Electricity in the treatment and cure of all diseases peculiar to woman . . . it is a cure for the most complicated troubles which no other remedy can reach."

As with many other mail-order schemes, if one did not readily swallow the Lorenz bait he was offered the belt at a lower price in due time, and permitted to purchase the "No. 12 Grade" ($27.50) for $22.50 and the "No. 10 Grade" ($18.50) for $16.50. Further, "Dr." Lorenz exhorted the prospective sucker:

> "If you cannot decide which grade may be most suitable for your condition, or if you wish any information concerning your ailment or my appliances, write me and I will give you my expert advice by return mail."

And of course there was the usual quack assurance, "All letters treated strictly confidential."

By 1935 business apparently had become so poor that a still more drastic price reduction had to be made, for a circular issued in that year offered these terms: "Regular Retail Price $25.00—Our Factory to Consumer Price $6.00."

The Lorenz concern flourished for at least thirty-five years before any government agency took action against it. Finally in December 1937 the Federal Trade Commission reported that it had prevailed on M. Hatzenbuehler, trading as the Lorenz Truss and Electric Works, Chicago, to cease and desist from falsely representing that his appliance preserves health or improves strength, or is valuable in the treatment of run-down conditions, weak nerves, rheumatism or poor circulation. Hatzenbuehler also promised to discontinue using the word "Doctor" as part of the trade name or in any other manner implying that a physician was or had been active in developing it.

After the business had been going for about thirty-six years the Post Office Department found out about it. On Jan. 31, 1939, that department called on the Lorenz Truss and Electric Works, D. Lorenz and the Electra Vita Company to show cause why a fraud order should not be issued against them. On March 14, 1939, Michael Hatzenbuehler, still operating the same old business, entered a denial of the charges of fraud but neither he nor any other representative of the enterprise put in an appearance on the date set for the hearing. Thereupon the Hon. Vincent M. Miles, Solicitor for the Post Office Department, recommended to the Postmaster General that the fraud order be issued, debarring the outfit from the mails.

Judge Miles's memorandum on the case alleged that the Lorenz group was receiving money through the mails for an "Electric Body Battery and Suspensory" by representing it as an effective and successful treatment for impotency, tumor, syphilis, systemic poisoning, diseases of the spinal cord and the brain, goiter, obesity, colitis, high blood pressure, intestinal obstruction, acute gonorrhea, arthritis, carcinoma, cystitis, fistula, fissure, hemorrhoids, prostatic disorders, stricture of the urethra, uterine complaints, paralysis and some other conditions. A typical advertisement was quoted:

> "MEN SEE FOR YOURSELF
>
> "If you are a sufferer of weakness, nervousness, lost vim or vigor, investigate Dr. Lorenze Electric Suspensory. It preserves health, improves strength. No medicine to take or Doctor Bills to pay. Small cost, quick results. Circular free. Lorenz, 5842 S. Tripp Ave., Dept. 9, Chicago, Ill.—9-7."

The memorandum cited from other Lorenz advertising matter statements on the therapeutic action of electricity that apparently had been "lifted" from medical literature and that indirectly quoted a "Dr. Martin," a "Dr. Massey" and a "Dr. Snow," who were not identified by initials.

Further, the memorandum showed that the Lorenz device was a suspensory-like appliance with two batteries and electrodes attached thereto. One each of these was fastened to the belt for application at the center of the back and the others were attached to the suspensory. With the appliance came some literature, "General Information and Directions" on the use of it and this also contained advice on bedroom ventilation, diet, bathing, exercise, sexual life and even hair cutting.

Judge Miles's summary of the case is worth quoting in full:

Careful tests of the Lorenz appliance in the Bureau of Standards, United States Department of Commerce, show that when applied to the body as directed the maximum current passing through the tissues as a result thereof is .006 of an ampere of galvanic electricity. According to the evidence before me, reflective expert knowledge and opinion in the fields of medical and electro-thermal matters shows that weak galvanic currents of this character were extensively tested in past generations in the treatment of divers ailments and affections but their use has been long since abandoned as futile and worthless. While according to the evidence use of high frequency currents which can be produced only by heavy and expensive generating equipment raise the temperature of the tissues and are thus of limited value in the treatment of a few chronic disease processes, the diseases and ailments claimed to be overcome by the promoters of this enterprise will not and cannot be conquered even by the use of such vastly superior electrical apparatus. According to the expert evidence, impotency, tumor, syphilis, goiter, obesity and the other diseases and conditions alleged to be amenable to successful treatment by use of the Lorenz belt are, moreover, so varied in their origin and nature as to necessitate not only careful diagnosis but a particularized mode of treatment adapted both to the special affection involved and to the individual sufferer, and attempts to treat diseases and conditions such as syphilis and tumors with the Lorenz appliance are worse than useless, for the reason that the delay caused thereby may result in progress of the affection to a point at which proper treatment has become futile.

"In his answer to the charges Mr. Hatzenbuehler in effect denies having offered his device for sale through the mails for diseases and conditions hereinbefore named. However, while divers attempted disclaimers are set forth in the literature, they are obviously included therein solely for use in the event of action against the promoters of the enterprise under the postal fraud statutes and the controlling effect of the literature is to the effect that the device constitutes an effective and successful treatment for the diseases and ailments to which reference is made therein.

"The evidence shows that this is a scheme for obtaining money through the mails by means of false and fraudulent pretenses, representations and promises, and I so find.

"I therefore recommend that a fraud order be issued against Lorenz Truss and Electric Works, D. Lorenz, Lorenz, Electra Vita Company, Not Inc., Electra Vita Company, and their officers and agents as such, at Chicago, Illinois."

Following up this recommendation, finally *after thirty-six years* the mails were closed to this long-time fakery on March 24, 1939. *Though the mills of God* (and government agencies) *grind slowly, yet they grind exceeding small.*

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## VITAL PRODUCTS COMPANY FRAUD

### Products Found to be not so "Vital"

The United States mails have been closed to one W. P. Marmon, trading as the Vital Products Company at Hoboken, N. J., in a memorandum declaring it a fraudulent mail-order scheme.

Marmon advertised in various publications circulating mainly in rural districts:

MEN WOMEN
100 Modern items
"PERSONAL NEEDS"
Valuable catalog FREE
VITAL PRODUCTS—A Hoboken, N. J.

Those who answered received a large illustrated printed circular offering for sale a number of alleged medicinal products and certain devices. Government chemists reported the former to consist of:

*Releana Tablets* (for reducing): In each tablet, ¼ grain of phenolphthalein, ½ grain of thyroid, and small amounts of plant extractives including apocynin.

*Tobac-Quit* (for tobacco habit): Essentially 3 per cent of silver nitrate, with water and oil of peppermint.

*Femi-Cones* (vaginal suppositories): Oxyquinoline, boric acid and benzoic acid, in cacao butter base.

*Femoline Vaginal Jelly (Femolient):* Oxyquinoline sulfate, lactic acid and boric acid. in a glycerite of starch base.

*San Souci Capsules* (for delayed menstruation): Essentially apiol, ergotin, a small amount of aloin and a trace of oil of savin.

*San Souci Tablets* (for suppressed or scanty menstruation): In each tablet, 1 grain of ferrous sulfate, together with aloe and cotton root bark.

*Vigor Tablets (El Spano):* In each tablet, essentially $2^{9}/_{100}$ grain each of damiana, strychnine, anhydrous ferric oxide, $1/_{12}$ grain of zinc phosphide and $34/_{100}$ grain of talc.

*Revita Tablets* ("blood tonic, stimulant and aphrodisiac"): In each tablet, 2.2 grains of Blaud's mass, ⅓ grain of manganese dioxide, $1/_{22}$ grain of zinc phosphide, and an unreported amount of strychnine and traces of arsenic and aloin.

Expert medical evidence was introduced by the government to show that the representations made for these nostrums as remedies for various disorders were false and fraudulent and their promoter, W. P. Marmon, was ordered to show cause why they should not be excluded from the mails as such. Marmon, by various excuses, obtained several delays in the case, claiming, for example, that the misrepresentations had been discontinued. As this was found to be untrue, however, the Solicitor recommended to the Postmaster General that a fraud order be issued, debarring Marmon's business from further use of the mails, and this was done on April 19, 1939.

Before the case was closed, Marmon appeared before the Post Office Officials and admitted that he did not believe he would be able to disprove the charges against him. This might be taken to mean that he was willing to abandon the promotion of these nostrums through the mails. He did, however, request permission to continue using the name Vital Products Company in connection with the sale through the mails of "rubber goods" designated "for the prevention of disease." He was told that compliance with his request was impracticable and that unless he agreed to discontinue the enterprise it would be necessary for the Post Office Department to proceed to consider the issuance of this fraud order. As Marmon did not agree to this suggestion, the fraud order was issued against the Vital Products Company and its officers and agents as such.

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## A KANSAS TUBERCULOSIS CURE FRAUD

### Post Office Department Debars C. E. Wray Scheme from the Mails

Once mail-order cures for tuberculosis were so common that the Bureau of Investigation issued a special pamphlet "Consumption Cures." Such promotions are exceedingly rare now; an occasional one does still exist.

From Salina, Kan., one C. E. Wray sold through the mails a "Cure" for tuberculosis known as "Wray's Tubercular Compound." It consisted of four products called "T. B. or Stomach Compound," "Hot Shot Liniment," "Liver Tablets" and "Kidney Tablets."

As a "come-on" Wray sent prospective customers a booklet which read in part as follows:

> "The Purpose of Wray's Tubercular Compound is to destroy the T. B. germ and to heal and build new tissue in these contour or lesions, by working through the blood stream. After using this Compound for several months, the blood stream will be in condition to heal the lesions and replace the tissues torn down by the tubercular germ. After this resistence has been built up the Tubercular germ has been destroyed."

There followed, of course, the inevitable testimonials from persons who believed they or their relatives had been cured by Wray's treatment.

Among the evidence presented by the Post Office Department was a report from government chemists showing the composition of various Wray nostrums to be as follows:

*T. B. or Stomach Compound:* Fluid extract of beef, horehound, bloodroot (seeds), black root, gentian root, yellow dock, "seippia" (sepia—cuttlefish bone?), catnip, bayberry, "lippe—Mexican root" (lippia?), cascara bark, burdock root, niggerhead root (echinacia?), peppermint and sodium benzoate.

*Liver Tablets:* Essentially aloin, cascarin, podophyllin, ginger, strychnine and alkaloids of belladonna.

*Kidney Tablets:* In each, 1 grain of saltpeter, and plant extractives including aloe, licorice, juniper and nux vomica.

*Hot Shot Liniment:* Essentially about 15 per cent of chloroform, about 1.2 Gm. of camphor per hundred cubic centimeters, with alcohol, water, some unidentified syrupy material and a small amount of soap.

The directions for applying the liniment are quoted below in the original spelling and punctuation:

"taking a small peace of cotton, soak the cotten with it then hold it on the knee and down the lage [leg?] about three times then put it on the heal of the foot then on the arch then under the toes. Then hold it back of the neck and just below of ear. Then hold on each lobe of the lungs both frunt and back. hold it on those parts till it burns then move to other places do this ever evening."

Hon. Vincent M. Miles, Solicitor for the Post Office Department, in his memorandum to the Postmaster General, recommending the issuance of a fraud order against the scheme, pointed out that there was nothing new about the drugs contained in these preparations and that they are without thera-

peutic effect for the purposes for which they are sold. The evidence showed that they would not and could not destroy the tubercle bacilli in the manner described.

In answer to the charges Wray claimed that, while certain circular material had been printed in his name in the past for use by an individual now no longer in his employ, he (Wray) did not use such literature himself in promoting the sale of his treatment. He claimed further that any statements made in his name that "in even the most discouraging cases" the treatment would "destroy the tubercle bacilli in the body" had been made by others than himself and without his knowledge or consent. The evidence, however, was said to show that the circulars quoted were regularly furnished by Wray to inquirers about his treatment and he so admitted to the Post Office inspector. Although Wray presented a number of statements from persons claiming to have been benefited by his nostrums, in his answer to the charges he declared that he himself did not even claim that his compound would cure tuberculosis.

The Solicitor's memorandum also brought out that on March 11, 1939, the District Court of Salina County, Kan., issued a permanent injunction restraining Wray from the unlawful practice of medicine until such time as he qualifies himself therefor in the manner provided by law.

The Solicitor found from the evidence that Wray's business was a scheme for obtaining money through the mails by means of false and fraudulent pretenses, and a fraud order was accordingly issued against it on April 6, 1939.

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# *Correspondence*

## RABIES IN ALABAMA

*To the Editor:*—The communication or Drs. J. L. Pomeroy and H. O. Swartout November 18 concerning our report (Rabies in Birmingham, Alabama, THE JOURNAL, July 29, 1939, p. 390) is gratifying for the interest it appears to have created.

Drs. Pomeroy and Swartout criticize the publication of our conclusions because "they have been seized on by enemies of public health work" to cast discredit on rabies control measures. Fear of criticism from cranks or quacks among the public or from well grounded and respected members of the profession never offers valid excuse for excluding from the medical press such facts and data as are pertinent to changing views in the practice of medicine and public health. What such critics fail to see and what Drs. Pomeroy and Swartout apparently do not realize is that any reflection on the efficacy of antirabies vaccine renders the control of the disease in dogs even more important.

Exception was taken to our fourth paragraph, which was intended to indicate the extremes of attitude as regards treatment. In the majority of cases moderate persuasion on the part of the physician is sufficient to influence the unbitten patient against taking treatment, but too often the patient is advised that vaccine should be administered to any person "contaminated in any way" by the saliva of a rabid animal. Our case histories bear this out. Patients in "extreme mental anguish" and persons with rabies psychosis are never refused treatment. Such mental states were not included among the indications for administering vaccine, however, because (in the absence of a bite) the psychosis could be treated just as effectively with sterile saline solution or diluted sterile milk. Neither produces "treatment paralysis" as far as we know.

Despite the fact that we pointedly stated that the incidence of rabies in dogs as presented in our report "represented incompleteness of data, not true incidence," Drs. Pomeroy and Swartout boldly declare on the basis of our data that "one obvious conclusion regarding the effectiveness of canine vaccination was not drawn. If the incidence of rabies among all dogs belonging to white owners was 1.5 per cent, while the incidence among vaccinated dogs (40 per cent of the whole group) belonging to white owners was 0.5 per cent, this would indicate that about 75 per cent of vaccinated dogs were protected by the treatment." We would have agreed with this statement in 1935 when we published similar data to show the effect of such vaccination but we have since learned that the number of animals suspected of being rabid and found positive by the laboratory is by no means an indication of total prevalence. In a survey completed in Birmingham last July, Denison and Leach (The Incidence of Rabies in Dogs and Rats as Determined by Survey, read before the Laboratory Section, American Public Health Association, Pittsburgh, Oct. 18, 1939) examined apparently normal dogs killed at the pound and dead dogs removed from the streets by the garbage department. The number of such dogs found rabid was sufficiently high to indicate that the total incidence is from three to four times greater than routine laboratory studies indicate. And because the vast majority of rabid dogs are never under suspicion it was concluded that any field study undertaken to determine the efficacy of prophylactic canine vaccination is of questionable value unless an examination for rabies is extended to include all dogs that die from any cause. In our report we did not refer to this survey because it had not been completed, but we did emphasize repeatedly that our figures on incidence of rabies among animals expressed only a fraction of the total prevalence.

Our declaration that "the persistence with which fatalities continue to be equally distributed among the treated and untreated" is not a conclusion, as stated by Drs. Pomeroy and Swartout, but a statement of fact (Alabama Vital Statistics), and the actual numbers (forty-eight deaths, twenty-three treated) were given in the preceding sentence of our report. "Affords ground for wide speculation" was the conclusion, or more properly the inference, which completed our sentence. In view of the fact that more than two thirds of the rabid animals in Birmingham are entirely unrecognized, it will probably never be possible even to approximate the total number of persons (white or Negro) who are bitten but who do not take treatment. Perhaps the circumstances are different in Los Angeles. We do believe it significant, in a disease in which infection appears so rarely following direct exposure, that so large a proportion of the few deaths that do occur are among the treated.

The main theme of our report to which Drs. Pomeroy and Swartout take exception is expressed as follows: "In the experiences cited there is little relation between mortality from rabies and the administration of antirabies vaccine, for (1) among the highly exposed untreated (Negro) population fatalities are no greater than among the highly exposed treated (white) population, and (2) such rare fatalities as do occur are equally distributed among the treated and the untreated."

Both statements 1 and 2 are factual as regards the distribution of fatalities. In Alabama from 1922 to 1939 there were forty-eight deaths, and among these twenty-three were of treated patients and fourteen of Negroes. In Birmingham from 1929 to 1939 there were three deaths and among these two were of treated patients and two were of Negroes. However, the objection is raised that the exposure rates for the two races are different and the inference is made that the white family probably keeps the dog at home and is bitten while caring for it during its illness, while the Negro permits his sick dog to roam about and bite some one else. On the contrary, 58 per cent of dogs owned by white people which we find rabid come to us from the pound, where they have been quarantined at the owner's request, or from a veterinary hospital where they have been sent for observation and care. Negroes ignore the disease and only seldom follow this procedure.

Factual data which point to equal exposure rates for the two races are as follows: 1. By actual survey it was determined that Negroes have practically as many dogs per family as white

persons (0.28 as compared to 0.32). 2. By the same survey Negroes were found to be more inadequately housed and living in more crowded conditions poorly separated from one another and from their dogs. 3. The segregated Negro areas are so scattered throughout Birmingham that loose dogs have free range to both populations. 4. The survey on the prevalence of rabies in dogs and rats, previously referred to, distinctly shows that the great majority of dead dogs removed by the garbage department to the incinerator and found rabid by us on laboratory examination were from areas that are predominantly Negro in population. This is further confirmation of our statement that Negroes submit few animals for laboratory examination because of their failure to suspect or recognize the disease.

Drs. Pomeroy and Swartout wonder why we, with our expressed opinions, give antirabies vaccine at all and appear surprised that we advocate a rabies control program. Our opinion of the vaccine was explicitly stated to the effect that "It is not inferred from this that vaccine is without value but rather that its value has been greatly exaggerated." This, together with the fact that nothing else can be done for the patient except cauterization of the wound, constitutes our reason for using the vaccine. And if these procedures are of limited value, which they most certainly are, then a dog control program seems fundamentally important to relieve a ridiculous situation.

We regret that our report may have been used to reflect criticism on any public health official or program, though we still feel that its publication was fully warranted for the information it contains. Certainly it does not minimize the necessity of a dog control program as basic and fundamental to the control of the disease and to the elimination of a big nuisance problem.

GEORGE A. DENISON, M.D.
J. D. DOWLING, M.D.
Birmingham, Ala.

Director of Laboratories and Health Officer, Jefferson County Board of Health, respectively.

## A PHILOLOGIC ADVENTURE IN PHARMACOLOGY

*To the Editor:*—The necessity for careful verification of foreign abstracts of published scientific research has recently been brought hôme to me forcibly. In *Chemical Abstracts* for June 20, 1939, page 752, appeared the following abstract:

> Poisoning by cobra venom. Symmetrical necrosis of the renal cortex. Uremia. A. Penna de Azevedo and J. de Castro Teixeira. Men. inst. Oswaldo Cruz **33**: 23-37 (1938).—Pathol. and anatomical changes in a fatal case of snake bite Bothrops jararaca) are described. . . .

This article aroused my curiosity because of a reference to striking changes produced in the kidneys in the particular case of snake bite cited. At that time I had conducted an extensive research concerning the effect of cobra venom solutions on kidney and liver function of laboratory animals and I had found, both by making physiologic function tests and by histologic examination of kidney tissue in some of the animals killed for this purpose, that administration of large doses of the drug for periods of several months did not produce appreciable changes in the kidneys (*Proc. Soc. Exper. Biol. & Med.* **41**:418 [June] 1939).

The abstract was furthermore perplexing, owing to the fact that cobras are not found in South American countries although these countries do harbor other dangerous reptiles. Moreover, the abstract in question contained two apparently contradictory assertions. The title read "Poisoning by Cobra Venom" but the text described pathologic changes produced by the bite of Bothrops jararaca.

In order to clear up the puzzle I requested the editor to lend me the original publication. A perusal of the article in the original Portuguese revealed that, while the title did speak of poisoning by cobra venom, the text referred to the bite of Bothrops jararaca. I could conceive of but one explanation for the apparent contradiction of terms, which was that the word cobra, as used in the Portuguese article, implied something other than that which it signifies to British, American and French investigators. Further inquiry confirmed my surmise. A search of Portuguese dictionaries, conversation with a South American consular official and especially a discussion of the whole subject with an eminent authority on romance philology, Prof. Leo Spitzer, of Johns Hopkins University, revealed that the word cobra in Portuguese is a generic term applied to all kinds of snakes. It is derived from the Latin coluber, a general term for snakes, and Portuguese writers speak of a cobra di capello (which is the Indian cobra), a rattlesnake cobra, a Bothrops cobra and other kinds of cobras or snakes. Curiously enough the Spanish word for snake is not cobra but culebra (cp. *culebra,* "cut"), which cannot be confused with English "cobra" as the Portuguese term is. This philologic explanation of the word cobra made the abstract quite clear. The venom of the Indian cobra consists largely of neurotoxic constituents or substances having a specific affinity for nervous elements. The venom of the South American vipers, as well as those of the North American rattlesnakes, on the other hand, contain much larger quantities of blood-destroying proteolytic and cytotoxic ingredients, which are very toxic for such parenchymatous organs as the kidneys; and the bites of such reptiles may well produce extensive kidney lesions.

More recently an even more striking confusion of terms and misinterpretation of the word cobra was discovered by me in another reference. In the *Quarterly Cumulative Index Medicus* there was a reference to an article by two foreign investigators which read as follows:

> Correa da Costa, C., and Duek, H., O veneno de cobra na dysmenorrhéa, Rev. de gynec. e d'obst. **2**: 10-15, July '38.

This reference on superficial examination was taken to refer to treatment of dysmenorrhea with cobra venom. Indeed the article was listed thus in the *Index* under the main caption of Dysmenorrhea and the subtopic Therapy, "—cobra venom (C. Correa da Costa and H. Duek) Rev. de gynec. e d'obst. **2**: 10-15, July, '38."

Being interested in therapeutic applications of cobra venom, I secured a copy of the original paper from the publishers and verified the title O veneno de cobra na dysmenorrhéa. On reading over the text, describing treatment of a series of cases of severe dysmenorrhea with solution of snake venom, I found to my surprise that in every case the venom administered was not that of the true or Indian cobra but crotalin, a preparation made from the venom of the South American rattlesnake. Here again the term cobra as used in the title of the paper was merely the generic name for snake and did not indicate the species employed, which, however, was fully described in the text.

An amusing feature of the latter report was the circumstance that the authors, while discussing the modus operandi of snake venom in relieving dysmenorrhea, quoted extensively from my original paper dealing with the pharmacodynamics of the Indian cobra, or Naia tripudians (*Proc. Nat. Acad. Sc.* **22**:61, 1936). Thus is appears that my South American confrères fell into the same error that trapped the American abstracters of the two Portuguese papers described here and attributed to me work which I had never done.

I have described this philologic adventure in order to impress investigators in the sciences, and particularly in the field of medicine, with the importance of maintaining a critical attitude when reading abstracts of foreign literature. Caveat lector: "Let the reader"—of scientific literature—"be ever on his guard."

DAVID I. MACHT, M.D., Baltimore.

# Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

## CALCIUM AND TUBERCULOSIS

***To the Editor:*—Could you possibly inform me of the therapeutic use of calcium, intravenously and orally, in the treatment of tuberculosis? Is it possible to aid in calcifying tuberculous lesions by calcium therapy?**

**John R. Gateley, M.D., Westfield, Mass.**

ANSWER.—Calcium has long been used in the treatment of tuberculosis probably largely because it was early found that its salts are sometimes deposited in tuberculous lesions. It seemed logical that if calcium was administered in large doses it would be available in sufficient quantity to play an active part in the healing of tuberculous lesions.

An important fact is that the deposition of lime salts occurs with great frequency in tuberculous lesions of the primary complex but with much less frequency in the secondary or reinfection type of lesions and, after all, it is the latter which cause nearly all the significant destruction in the animal and human body. Calcium salts are deposited only in caseous material and there is evidence to lead to the belief that the tuberculous lesion is quiescent before the deposition of calcium occurs. Another significant fact is that the tuberculous lesion does not progress in the dead, caseous material where calcium is deposited but in the surrounding living tissue. Thus the deposition of calcium apparently has little effect on the control of tuberculous lesions. That which casts shadows on the x-ray film or that seen at postmortem examination only indicates points where destruction has occurred.

Nevertheless there is extant the belief that the administration of calcium is indicated in tuberculosis. Unfortunately, despite the large number of clinical reports of favorable results from calcium administration there seems to have been no extensive clinical study sufficiently controlled to be of scientific value. On the other hand, clinical observations have been made which were negative but, unfortunately, they were not well controlled.

Numerous attempts have been made to increase the calcium content of the blood. For example, Denis and Minot gave normal persons 6 Gm. of calcium lactate by mouth for from six to ten days but found no increase of the blood content. In cases of tetany with a fall in the serum calcium, from 10 to 11 mg. per hundred cubic centimeters to an average of 5.6 mg., Howland and Marriott administered calcium by mouth with the result that the blood calcium rose to normal in some cases but in others it could not be raised above 7.5 to 9 mg. In animals with a low blood calcium content, Denis and Minot were able to increase the calcium by feeding it but could never bring it above the usual normal amount. It appears that the normal amount of calcium found in the blood of both man and animals represents about all that the blood can carry.

Heubner and Rona administered subcutaneously large doses of calcium chloride to cats and produced a rise in the blood calcium of about 40 per cent within ninety minutes, but within five to six hours the calcium content of the blood had returned to normal. When calcium in large quantity is introduced intravenously, the blood content may be raised to two or three times the normal but within two hours it has returned to the normal amount.

Mayer and Wells studied the tissues of guinea pigs that were fed the usual laboratory diet without addition of calcium and found marked individual variations in the amount of calcium in the same organ of different animals and also a variation in the amount of calcium in different organs of the same animal; but when averages were obtained the proportion of calcium in each of the tissues studied was found to be nearly the same. These authors then studied the tissues of another group of guinea pigs on the same diet except that calcium was fed, with the result that usually they found that these animals did not have more calcium in their tissues than those which had not been fed calcium.

In another group of guinea pigs which were tuberculous but were given the same diet to which calcium was added it was found that calcium in the nontuberculous organs was not increased but was definitely increased in those organs which were tuberculous. This was true also in another group of tuberculous animals which did not have calcium added to the diet. Thus it did not appear that the administration of calcium results in greater deposition in tuberculous lesions than occurs in animals on an ordinary diet. It has been pointed out that tuberculous patients usually take milk as a part of their diet and that its calcium content together with that of other foods is adequate.

Halvorson studied the calcium content of the blood of persons suffering from pulmonary tuberculosis. Among those with minimal disease who were improving, the calcium in the serum was found to be normal and quite constant. These patients were on a high milk diet but in no case was the calcium content of the blood found above normal. In advanced cases there was some variation in the calcium content but on the whole there was no marked deviation from the normal.

One frequently meets the statement that dental caries occurs among persons with clinical tuberculosis because of the demand for calcium in healing the tuberculous lesions; in fact, it is often stated that this demand is met by removal of calcium from the teeth. However, Kiehnle was unable to obtain any evidence whatever to support this belief.

Parathyroid and calcium have been employed in the treatment of tuberculosis because it was found that parathyroid extract mobilizes calcium in serum. Calcium and cod liver oil have been used because it was found that calcium metabolism is affected in rickets by the fat soluble vitamin of the oil. However, in patients so treated there has been no definite evidence of increase in the deposition of calcium in the tuberculous lesions.

Thus, good investigations do not support the view that demineralization and especially a loss of calcium from the various tissues of the body accompanies tuberculosis. Moreover, there is no evidence that the administration of calcium to animals or man with a normal blood calcium content increases the content of calcium in the blood or the tissues except for a brief period. Therefore, no matter how much calcium is administered it is not taken up by the blood beyond the usual normal limits; thus there is no more in the blood stream to be deposited in the tuberculous lesions than when the ordinary daily calcium requirement is provided through the food.

In the control of symptoms of tuberculosis of the intestine, however, calcium chloride may be of considerable value. For this purpose it may be administered intravenously in doses of 5 cc. of a 5 per cent solution once or twice each week.

## LATE SYPHILIS AND MARRIAGE

***To the Editor:*—A man had a painless swelling of the right testicle one year ago. His physician, a competent urologist, made a diagnosis of syphilis on the basis of repeated positive serologic reactions. Antisyphilitic treatment was started and a short time afterward the mass disappeared. Since that time the patient has been receiving continuous treatment. He gives no history of a chancre or any secondary eruptions. However, he thinks the disease might have been contracted about six years ago. I do not know what present serologic tests of his blood indicate. He would like to marry, so he asked his physician for advice concerning this matter. The physician advised him to have a bilateral vasectomy before marrying. The patient would like to have children and is therefore quite concerned over this matter. I would much appreciate your opinion on this case.**

**M.D., Illinois.**

ANSWER.—Symptomless infections with syphilis are far from uncommon. This is particularly true in women, but the same type of situation is also found in men and it is possible that this man may have had such an infection. Evidently the process in the testicle was a gumma, and these lesions are usually painless. Much depends on how much treatment the patient has had and on his present condition.

In a case of late syphilis of this sort it is felt that the person should receive continuous treatment with alternating courses of arsenic and bismuth compounds until he has received a total of at least three or four ten injection courses of an arsenical, for example neoarsphenamine or mapharsen, and of a bismuth compound, perhaps an oil suspension of bismuth subsalicylate. As a rule treatment should be kept up until his serologic reactions have been negative for at least one year. However, at the end of the suggested amount of treatment, if his physical examination and his lumbar puncture give negative results and if careful x-ray examination of the cardiovascular system shows no evidence of syphilitic involvement, the continuous therapy may be changed and thereafter the patient may be given two further courses of bismuth subsalicylate intramuscularly a year for two years.

If this is the case there is no apparent reason why it would not be all right for this man to marry, particularly since his disease was probably six years old at the time he consulted the

physician. There are no obvious indications for a bilateral vasectomy. The older a syphilitic infection, the more difficult is its transmission, and this applies particularly to men. If such a person has had his syphilis for six years, if he has had sufficient treatment, one need have little fear about the transmission of the disease to his wife.

## STOMATITIS—DENTAL REPAIR OF PULPLESS TOOTH

*To the Editor:*—**1. A patient recently suffered from a condition diagnosed as "acute catarrhal stomatitis," characterized by edema and ulceration of the buccal mucous membrane with tenderness, more severe on one side and most severe in the region of the third molars on both sides. Could this condition have come from the leakage of beechwood creosote from an upper molar on the more affected side which was receiving dental treatment? What would be the cause of stomatitis with large painful ulcers and its treatment? 2. In the treatment of an upper molar which requires the removal of the contents of the pulp chamber, is it more advisable to attempt treatment that will permit the tooth to remain in the mouth or to remove the tooth and place a "bridge" in its stead?**

**M.D., Connecticut.**

ANSWER.—1 (a) It seems unlikely that the condition described would result from leakage of beechwood creosote from the upper molar under treatment. Beechwood creosote would produce a local inflammation of the soft tissues around the point where the leakage occurred. Presence of inflammation which is most severe in the region of the third molars on both sides would suggest that the cause might be infectious in nature and not due to local action of the drug.

(*b*) The most common type of stomatitis with large painful ulcers is probably "aphthous stomatitis" or "canker sores." The etiology of this condition is unknown; treatment consists of cauterizing the ulcers with 10 to 40 per cent silver nitrate. Vincent's infection often presents small ulcers on the gingivae which are quite painful; sometimes Vincent's infection is complicated by aphthous stomatitis. It is impossible to give a diagnosis from the scanty information furnished, for ulcers in the mouth may be due to several widely different conditions. Further information may be found in:

Prinz, Hermann, and Greenbaum, S. S.: Diseases of the Mouth and Their Treatment, ed. 2, Philadelphia, Lea & Febiger, 1939, particularly pages 190 to 235.

2. It is generally conceded by dental authorities that it is possible to remove the pulp, fill the root canals and thus safely retain for years a badly broken down tooth. Of course, such treatment should be attempted only in carefully selected cases considering the patient's age, general health, presence of infection around the apexes, anatomy of the root canals, value of the tooth to the patient, and similar factors. It is impossible to say whether or not the particular tooth in question should be treated or extracted. Many upper molars are treated with good results. Further information is given by:

Blayney, J. R.: Tissue Reactions in Apical Region to Known Types of Treatment, *J. Dent. Res.* **9:** 221, 1929; **10:** 425, 1930.
Coolidge, E. G.: Pathology and Treatment of the Pulp and Preparation of Root Canal for Filling, *J. Am. Dent. A.* **19:** 1964, 1932.

## PROLONGED SECOND STAGE LABOR

*To the Editor:*—**If the fetal heart tones are good and the mother in good condition, is intervention indicated even after four hours of protracted second stage labor? May it not require longer for an oversized head to mold? What are the dangers of prolonged second stages?**

**I. I. Rosen, M.D., L'Anse, Mich.**

ANSWER.—The normal duration of the second stage of labor will vary considerably in different individuals. It will depend on the adequacy of the pelvis, the size of the baby, the effectiveness of the forces of labor and the resistance offered by the soft parts. A small pelvis, particularly a decreased size of the outlet, will prolong the second stage of labor. The baby with a large head will require a longer time to pass through the birth canal than the small baby. Poor pains slow progress considerably. Soft structures that are rigid and inelastic may offer considerable resistance to the presenting part.

The advisability of intervention will likewise depend on several factors, such as the level of the head in the birth canal, the position of the head, evidences of disproportion between the presenting part and the pelvic planes, the facilities available for safely terminating the second stage, and the experience of the physician conducting the labor. No well defined rules can be laid down as to the length of this stage of labor. If the patient is in a hospital and the fetal head has been on the pelvic floor for from one to two hours without progress, delivery may be accomplished by episiotomy and the use of low forceps. Such a procedure properly carried out will not increase the hazards of mother or baby and may safeguard their interests. In the home, under less ideal conditions, it is usually advisable to wait longer. On the other hand, if the fetal head is at a higher level in the pelvis, if the occiput has failed to rotate anteriorly and the head remains arrested in the transverse or the posterior position, if a narrow outlet is present, delivery by forceps becomes a more formidable procedure with increased hazards to the maternal structures and to the baby. These increased dangers usually outweigh any advantages that might accrue from an earlier termination of the second stage. Under these circumstances it is good practice to allow the patient to continue in the second stage and to make the most use of the natural forces of labor as long as the condition of the mother and the baby is not jeopardized.

There are definite dangers to the mother and to her baby in a prolonged second stage. The continued pounding of the fetal head against the soft tissues increases the trauma to important structures. Traumatized tissues heal poorly. Trauma and long labor increase the incidence of infection. There is an increased likelihood of injury to the fetus in a prolonged labor. Excessive molding and continued pressure of the fetal head, particularly when this presenting part remains on the perineum an unusually long time, increase the hazards of intracranial trauma. Natural deliveries following long labor and occasionally even short labor account for an appreciable number of serious and fatal accidents to the fetus.

## PARTIAL ONYCHOLYSIS

*To the Editor:*—**A woman aged 72 had her gallbladder and appendix out at 50, at which time a nutmeg liver was observed. About that time a competent cardiologist said of her cardiogram "It shows that she must have had high blood pressure at one time." She had "walking typhoid" about the fall of 1898 with no known complications. Now her blood pressure is 160 systolic, 76 diastolic and pulse 76, with no irregularities noted. In February 1939 she had an emergency operation for torsion of a cyst of the left ovary, the cyst being from 10 to 12 cm. in diameter. Recovery was good except for cystitis and urethritis following catheterization after the operation. This is better but not well. I have hesitated to use sulfanilamide on account of her liver. The thing she worries most about is a finger nail which since last May has been separating from the finger. Now it is about 6 mm. back in the center, while one side is almost normal. However, it is tender and there is a red streak 2 mm. wide all along the distal connection between the finger and the nail. The nail itself appears normal and so does the rest of the finger. None of the nails show any suggestion of thickening or the worm-eaten look seen in tinea. A little help will be appreciated.**

**M.D., Minnesota.**

ANSWER.—The condition is probably partial onycholysis. Local causes act by pressure from beneath, as papules of syphilis, psoriasis, warts or corns, by local inflammation of the nail fold, as eczema and dermatitis venenata, or by simple maceration as in dishwashers and housewives. The experience of H. J. Templeton, of Oakland, Calif., was illuminating. He found and reported five cases (THE JOURNAL, Dec. 26, 1931, p. 1950) of partial or complete onycholysis in girls who were occupied in washing paste from catsup bottles all day long. He decided that the only local cause was maceration and discovered that by testing applicants for the job for forty-eight hours he could discover and eliminate the susceptible ones. There was a predisposition to onycholysis in a considerable percentage of the girls in the community.

At present the prevailing theories to account for such a predisposition are avitaminosis and endocrine abnormalities. The latter is supported by the frequent occurrence of onycholysis in young girls with hyperhidrosis, with or without acrocyanosis and by the experience of E. C. Fox, of Dallas, Texas, who studied thirty cases of this disorder. Many of the patients showed symptoms of hypothyroidism and a low metabolic rate. A considerable proportion improved on administration of thyroid and in some of them relapses occurred when the medication was stopped. This paper was read at the 1939 meeting of the American Dermatological Association.

Other therapeutic suggestions were made in Queries and Minor Notes (THE JOURNAL, Aug. 5, 1933, p. 468; March 13, 1937, p. 910).

## LEAD POISONING AND PARKINSONISM

*To the Editor:*—**Is there any known relationship between saturnism and parkinsonism? Is it possible that chronic lead intoxication causes Parkinson's syndrome?**

**Jose Martorelli, M.D., Argentina**

ANSWER.—There is no known relationship between lead intoxication and the Parkinson syndrome. Although chronic lead poisoning (saturnism or plumbism) causes a severe encephalopathy, no cases of parkinsonism have been described. There is, therefore, no information which would indicate that lead intoxication causes the Parkinson syndrome. Manganese is one of the metals known to cause a parkinsonian-like state.

## DANGERS OF COCAINE SOLUTION IN NOSE

*To the Editor:*—The following solution was recommended to me as a nasal spray for chronic sinusitis: 2 parts of cocaine hydrochloride, 5.2 parts of boric acid and sufficient distilled water to make 360 parts, to be used as needed. Kindly advise me if there is sufficient absorption to lead to habit formation if this is used as frequently as every fifteen minutes.

M.D., Ohio.

ANSWER.—Cocaine in aqueous solution is absorbed from all mucous membrane surfaces in all concentrations. The concentration of cocaine in the solution given is 0.55 per cent. A well known authority on treatment and toxicology states that "the use of a one-half per cent solution of cocaine as a spray in catarrh and related conditions is to be condemned because of the imminent danger of the establishment of the cocaine habit." The solution given, used as often as stated, would be decidedly dangerous.

## INHERITANCE OF PSORIASIS

*To the Editor:*—Will you kindly discuss the hereditary aspects of psoriasis? I have a patient whose great grandfather, grandfather, father and one paternal aunt had psoriasis. Also the patient has a sister who has psoriasis and pemphigus. The patient is 23 years old and is entirely normal. She was recently married to a man whose family history is entirely negative. She wants to know what the chances are of her offspring inheriting these diseases.

M.D., Kansas.

ANSWER.—There is no evidence that pemphigus has any hereditary tendency. So far as psoriasis is concerned, numerous authors have commented on the familial tendency. It is not certain whether this tendency is any greater than the average incidence of psoriasis, which runs about 2 per cent of all cutaneous disease. One cannot prophesy, of course, with regard to psoriasis as to whether it will be severe or mild, and the usual advice to the patient is that it is not a contraindication to marriage. The fact that the patient herself has got to the age of 23 and not had psoriasis would be an encouraging factor so far as offspring are concerned. She can, of course, develop psoriasis later, but even then it would not necessarily mean that her child would have psoriasis. Generally speaking it is felt that psoriasis is not contagious, although the exact cause is not known.

## DERMATITIS FROM SPECTACLE FRAMES

*To the Editor:*—Have you any information regarding pyroxalin or zylonite, now widely used in spectacle frames and temple pieces, as a cause of postauricular dermatitis?

S. R. Salzman, M.D., Toledo, Ohio

ANSWER.—Dermatitis from spectacle frames in the beginning is sharply limited to points of contact with the skin, and therefore the dermatitis involves a linear area in front of the ear as well as being postauricular. It most frequently occurs in persons who are sensitive to chromium or to the nickle contained in white gold frames. Less frequently dermatitis results from celluloid, bakelite and various newer plastic compounds. According to White (The Dermatergosis or Occupational Affections of the Skin, London, H. K. Lewis & Co. **4**:199, 1934) celluloid, better known as xylonite, is a lower nitrate of cellulose dissolved with acetone and camphor. Bakelite is a product formed by condensation of phenol with formaldehyde or similar substances. Variation in proportion of phenol and formaldehyde may result in a consistency like rubber (ibid., p. 250). The substances mentioned are primary skin irritants in higher concentrations and many people are sensitive to them, even to formaldehyde in minute dilutions. In addition, so-called horn rimmed spectacle frames may contain dyes for coloring that are irritating; and chrome and lime used in polishing the frames may remain adherent to the frame and cause dermatitis. Dermatitis from spectacle frames most frequently results in the summer when perspiration is profuse (Weber, Leonard F.: External Causes of Dermatitis, *Arch. Dermat. & Syph.* **35**:133 [Jan.] 1937). To prove that the spectacle frames are the irritating factor, apply the frame or a portion of it to the forearm with a moist pad and cover with oiled silk and adhesive tape and allow to remain for twenty-four hours as a patch test.

## COCONUT WATER AS DIURETIC

*To the Editor:*—I have been told two or three times by intelligent people who live in the tropics that they have obtained real benefit in various urinary disturbances by the use of coconut water, particularly as a diuretic. Can you tell me if there is any basis for this belief?

Lay Martin, M.D., Baltimore.

ANSWER.—The *Quarterly Cumulative Index* contains only one reference to coconut water in the last twenty years. In this article (Axtmayer, J. H.: *Am. J. Trop. Med.* **12**:323 [July] 1932) the following statement is found: "Coconut water is taken by the people of Porto Rico both as a refreshment and as a diuretic. This latter use is probably based on tradition, as no literature has been found which proves that coconut water is physiologically active in this respect." The author, however, does demonstrate that coconut water is a good source of vitamin $B_2$ (G).

The composition of coconut water indicates that it is a hypotonic solution and hence should be almost as good a diuretic as tap water. In the tropics it would probably be safer to drink than unboiled water. The beneficial effect would depend on the quantity ingested rather than on any specific virtue of coconut water.

## AZOOSPERMIA

*To the Editor:*—Will you kindly give me the treatment and prognosis in a case of azoospermia? The subject is a man aged 29 who has never had any serious illness and is in good health at present—good physical development, normal sexual function and no detectable abnormalities on physical examination. What is the consensus on the use of Antuitrin-S, vitamin E and Gonadogen?

M.D., Illinois.

ANSWER.—In the treatment of azoospermia the main point is exact diagnosis. It is essential to know whether the condition is due to an obstruction in the tubes or whether the testes themselves do not produce any spermatozoa or whether both conditions are present. This diagnosis can be made only by direct aspiration of the testes. If spermatozoa are found in the aspirated testicular fluid, that the condition is due to tubal obstruction is known at once even if there never has been a history of gonorrhea or epididymitis. If, however, no spermatozoa are found, the condition is of testicular origin and no operation on the tubes is indicated even if they are known to be obstructed.

The treatment of azoospermia may be either surgical or endocrine. The endocrine therapy is not satisfactory and is still being subjected to experimentation with various gonadotropic preparations. Such treatment should be in the hands of a specialist.

If the condition is due to an obstruction in the tubes, the only relief is epididymovasostomy. This operation must not be undertaken unless aspiration has shown that the testes can produce spermatozoa. It must also be remembered that x-rays applied to the testicular region either for diagnosis or for treatment will at times destroy the spermatogenic function of the testes, and the patient must not allow himself to be exposed to their influence.

## SMOKING AND SUCKING PLEASURE

*To the Editor:*—In his article "The Contributions of Psychoanalysis to the study of Psychosis" in The Journal, Sept. 2, 1939, page 923, Dr. Ives Hendrick states that, "because many of a psychotic person's acts do gratify needs which are normally dominant during the suckling stage of development, some analysts have been content to explain psychosis as a 'fixation' at the oral stage." Could you inform me whether smoking pipes, cigars or cigarets can be attributed, to some extent, to the sensations experienced at the suckling stage?

M.D., Michigan.

ANSWER.—To some extent, varying in individual smokers, smoking provides a pleasure from the lips by sucking which was originally a more intense and essential experience in infancy.

## ANISEIKONIA

*To the Editor:*—Relative to the article in the November issue of *Cosmopolitan Magazine*, page 50, by Albert Wiggins, I would appreciate any information you can give me on the subject referred to as "aniseikonia," as I have several patients who would like to visit Dartmouth Clinic if the treatment merits recommendation.

David Glass, M.D., Louisville, Ky.

ANSWER.—Aniseikonia is one of several factors which may cause eyestrain. Of course the commonest causes are errors of refraction and motor difficulties. Many patients with eyestrain not previously relieved by the glasses given them for these defects would be relieved if glasses were better chosen and if the general condition and especially the mental and nervous factors were taken care of.

Aniseikonia, though long known, was only recently given a name, and that because a remedy had been devised. Aniseikonia is a difference in size or shape of the ocular images of the two eyes. If it is great enough to overtax the ability of the patient to combine the images into a single perception it causes eyestrain. The number of patients not otherwise relievable is not large but is definite.

If occluding one eye for a week or two gives relief from the symptoms, it is strong evidence that the cause of the eyestrain is binocular. If motor difficulties can be excluded, then it is probable that aniseikonia is responsible and at any rate should be investigated, either at Dartmouth or at one of the places

where eikonometers are in use (New York: New York Eye and Ear Infirmary and Columbia Medical Center; Baltimore: Wilmer Institute; St. Louis: Washington University).

Unfortunately a negative result from occlusion does not rule out binocular trouble, so that the only conclusive means of diagnosis is an eikonometer test and a trial of eikonic glasses.

### "TONGUE-TIE" IN INFANTS

*To the Editor:*—Is there such a clinical entity as "tongue-tie" in newborn infants? If so, what symptoms can be attributed to it and what corrective measures are advisable? If one recognizes such an entity, is it rare?

M.D., California.

ANSWER.—There is such a clinical entity as "tongue-tie" in infants. Moderate degrees of it are not especially rare. The frenum may be so short as to be almost absent, or the membranous portion of the frenum may extend or be inserted so far forward that the tongue cannot be raised or protruded normally. The tongue may be slightly bifid at the tip as a result. "Tongue-tie" never causes difficulty in nursing, presents little interference, if at all, with articulation, and never causes delayed speech. Unless "tongue-tie" is serious it rarely requires treatment. Moderate gradations in which the tongue can be protruded to the external margin of the lips may safely be let alone, as elongation of the frenum occurs as the infant grows. Extreme cases can be remedied by the simple procedure of raising the tip of the tongue and cutting through the filmlike frenum, care being taken not to cut the vessels. Undoubtedly the frenum is clipped more often than necessary.

### HAY FEVER DESENSITIZATION AND IMPOTENCE

*To the Editor:*—I have been treating a white man, aged 46, for hay fever. His symptoms lasted thorugh late spring and the entire summer, and scratch tests showed sensitivity to the local grasses and weeds. He received the usual course of injections for desensitization during 1939, with marked relief. At the end of the hay fever season he stated that he had been relatively impotent (sexually) since starting treatment. I had intended to continue the desensitization therapy throughout the year, but after I had given him his monthly injections for October 1939 he again complained of impotence for about a week. (The symptom had cleared up, incidentally, before this injection.) He complains also of vague backache and irritability. He has had no constitutional reactions nor any local reactions of consequence to the administration of pollen extract. Results of physical examination, as well as urine examination, are negative. The history is unimportant except for gonorrhea in 1919 and malaria in 1908 and 1920, while he was in the tropics. Have such reactions been reported? Is any special therapy indicated if the impotence is caused by the pollen extract? The patient is convinced that the injections and the impotence are cause and effect. M.D., New York.

ANSWER.—No mention has been found in the literature to impotence induced by pollen injections. It is possible that the condition is of psychogenic origin. It would be interesting to try an injection of sterile saline solution with possibly a little glycerin to simulate a pollen injection and observe the effect.

### LEAD FREE CRAYON CHALKS

In The Journal Nov. 4, 1939, page 1755, appeared a Query and Minor Note dealing with the hazards from lead in chalks. Several manufacturers have since written to the Editor reporting the availability of colored crayons and chalks free from this dangerous element. The following brands are stated to be entirely free from lead:

| | |
|---|---|
| Hygieia Forsyte<br>Ambrite<br>Poster Pastello | American Crayon Company,<br>Sandusky, Ohio |
| Alphasite<br>Alphacolor<br>White Crown | Weber Costello Company,<br>Chicago Heights, Ill. |
| Anduseptic<br>Atlantic | Binney & Smith Company,<br>New York. |

### STAINING OF LIPS FROM SMOKING

*To the Editor:*—In The Journal Oct. 14, 1939, page 1510, a query appeared, "Stained Lips from Smoking," in which I am interested. In answer it is said that the experience seems unique. I have had the same personal experience. I have smoked for many years but it is only recently that my lips have been stained from smoking. I have not changed my habits: The daily number of cigarets I smoke is the same and the tobacco used is identical. As I shave my mustache, I became aware of the stain on my lips from the first. It appears on the side on which I hold the cigaret. The color rubs off easily and completely with a handkerchief. However, if it is not removed immediately after smoking it becomes dark. If I hold the cigaret with my lips on the other side of my mouth the stain appears on that side. If I use a short cigaret holder the stain does not appear. I have asked several smokers whether they have had such an experience and they say they have not. So it really seems that the experience is rare.

Jean Didiée, Secteur Postal 390, France.

## *Council on Medical Education and Hospitals*

### ADDITIONAL HOSPITALS APPROVED

The Council on Medical Education and Hospitals of the American Medical Association has given its approval to the following hospitals since the publication of the last previous list in THE JOURNAL, June 17, 1939:

#### Hospitals Approved for Intern Training

City Hospital, Mobile, Ala.
St. Joseph's Hospital, Alton, Ill.
Cook County Hospital, Chicago.
Murray Hospital, Butte, Mont.
Perth Amboy General Hospital, Perth Amboy, N. J.
Unity Hospital, Brooklyn.
Our Lady of Victory Hospital, Lackawanna, N. Y.
Leonard Hospital, Troy, N. Y.
James Walker Memorial Hospital, Wilmington, N. C.
St. Mary's Infirmary, Galveston, Texas.
Kanawha Valley Hospital, Charleston, W. Va.

#### Residencies and Fellowships

*Anesthesiology*
Michael Reese Hospital, Chicago.
Presbyterian Hospital, New York City.
St. Vincent's Hospital, New York City.
Presbyterian Hospital, Philadelphia.

*Cardiology*
House of the Good Samaritan, Boston.

*Fractures*
Presbyterian Hospital, New York City.

*Mixed*
St. Mary's Hospital and Sanatorium, Tucson, Ariz.
Malden Hospital, Malden, Mass.
Parkside Hospital (col.), Detroit.
Alexian Brothers Hospital, St. Louis.
Christian Hospital, St. Louis.
Jewish Sanitarium and Hospital for Chronic Diseases, Brooklyn.
Elizabeth Buxton Hospital, Newport News, Va.
St. Luke's Hospital, Richmond, Va.

*Neurosurgery*
Johns Hopkins Hospital, Baltimore.
Barnes Hospital, St. Louis.

*Ophthalmology*
Hospital of the University of Pennsylvania, Philadelphia.

*Ophthalmology-Otolaryngology*
Louisville City Hospital, Louisville, Ky.

*Otolaryngology*
Michael Reese Hospital, Chicago.
Presbyterian Hospital, New York City.

*Pathology*
French Hospital, San Francisco.
Sibley Memorial Hospital, Washington, D. C.
University Hospital, Augusta, Ga.
Passavant Memorial Hospital, Chicago.
St. Francis Hospital, Wichita, Kan.
Worcester City Hospital, Worcester, Mass.
Jewish Hospital, St. Louis.
Mount Sinai Hospital, New York City.
Roosevelt Hospital, New York City.
Sydenham Hospital, New York City.

*Plastic Surgery*
Presbyterian Hospital, New York City.

*Radiology*
Hartford Hospital, Hartford, Conn.
Sibley Memorial Hospital, Washington, D. C.
Veterans Administration Facility, Washington, D. C.
Walter Reed General Hospital, Washington, D. C.
Passavant Memorial Hospital, Chicago.
Veterans Administration Facility, Hines, Ill.
Indiana University Hospitals, Indianapolis.
Barnes Hospital, St. Louis.
Homer G. Phillips Hospital for Colored, St. Louis.
New York Polyclinic Medical School and Hospital, New York City.
Roosevelt Hospital, New York City.
Watts Hospital, Durham, N. C.
St. Vincent's Hospital, Portland, Ore.
Abington Memorial Hospital, Abington, Pa.
Bryn Mawr Hospital, Bryn Mawr, Pa.
Graduate Hospital of the University of Pennsylvania, Philadelphia.
Hospital of the Protestant Episcopal Church, Philadelphia.
Presbyterian Hospital, Philadelphia.
John Gaston Hospital, Memphis, Tenn.
Methodist Hospital, Memphis, Tenn.
Vanderbilt University Hospital, Nashville, Tenn.
Columbia Hospital, Milwaukee.

*Surgery*
Michael Reese Hospital, Chicago.
Methodist Episcopal Hospital, Indianapolis.
Beverly Hospital, Beverly, Mass.
Missouri Baptist Hospital, St. Louis.
Jefferson Hospital, Roanoke, Va.

*Thoracic Surgery*
Hudson County Tuberculosis Hospital, Jersey City, N. J.
Mount Morris Tuberculosis Hospital, Mount Morris, N. Y.
Muirdale Sanatorium, Wauwatosa, Wis.

*Tuberculosis*
Mississippi State Sanatorium, Sanatorium, Miss.
Homer G. Phillips Hospital for Colored, St. Louis.
Essex Mountain Sanatorium, Verona, N. J.
Mount Morris Tuberculosis Hospital, Mount Morris, N. Y.
Riverside Hospital, New York City.
Franklin County Sanatorium, Columbus, Ohio.
Muirdale Sanatorium, Wauwatosa, Wis.

# Medical Examinations and Licensure

## COMING EXAMINATIONS

### NATIONAL BOARD OF MEDICAL EXAMINERS SPECIAL BOARDS

Examination of the National Board of Medical Examiners and Special Boards were published in THE JOURNAL, December 30, page 2446.

### STATE AND TERRITORIAL BOARDS

ALABAMA: Montgomery, June 18-20. Sec., Dr. J. N. Baker, 519 Dexter Ave., Montgomery.

ALASKA: Juneau, March 5. Sec., Dr. W. W. Council, Box 561, Juneau.

ARKANSAS: *Basic Science.* May or June. Sec., Mr. Louis E. Gebauer, 701 Main St., Little Rock. *Medical* (Regular). Little Rock, June 6-7. Sec., Dr. D. L. Owens, Harrison. *Medical* (Eclectic). Little Rock, June 6-7. Sec., Dr. Clarence H. Young, 1415 Main St., Little Rock.

CALIFORNIA: *Oral examination* (required when reciprocity application is based on a state certificate or license issued ten or more years before filing application in California), Los Angeles, Jan. 17. *Written examination.* Los Angeles, Feb. 26-29. Sec., Dr. Charles B. Pinkham, 420 State Office Bldg., Sacramento.

CONNECTICUT: *Basic Science.* New Haven, Feb. 10. Chairman, Dr. Charles M. Bakewell, State Board of Healing Arts, 1895 Yale Station, New Haven. *Medical.* Hartford, March 12-13. Sec., Dr. T. P. Murdock, 147 W. Main St., Meriden. *Homeopathic.* Derby, March 12-13. Sec., Dr. Joseph H. Evans, 1488 Chapel St., New Haven.

DELAWARE: *Examination.* Dover, July 9-11. *Reciprocity.* Dover, July 16. Sec., Medical Council of Delaware, Dr. Joseph S. McDaniel, 229 S. State St., Dover.

DISTRICT OF COLUMBIA: *Basic Science.* Washington, April 22-23. *Medical.* Washington, May 13-14. Sec., Dr. George C. Ruhland, 203 District Bldg., Washington.

FLORIDA: *Basic Science.* De Land, May 25. Sec., John F. Conn, De Land. *Medical.* Tampa, June 17-18. Sec., Dr. William M. Rowlett, Box 786, Tampa.

GEORGIA: Atlanta, June. Joint-Sec., Mr. R. C. Coleman, 111 State Capitol, Atlanta.

IDAHO: Boise, April 2. Dir., Bureau of Occupational Licenses, Mr. H. B. Whittlesey, 355 State Capitol Bldg., Boise.

ILLINOIS: Chicago. Jan. 23-25. Acting Superintendent of Registration, Mr. Lucien A. File, Springfield.

INDIANA: Indianapolis, June 18-20. Sec., Board of Medical Registration and Examination, Dr. J. W. Bowers, 301 State House, Indianapolis.

Iowa: *Basic Science.* Des Moines, Jan. 9. Dir., Division of Licensure and Registration, Mr. H. W. Grefe, State Department of Health, Capitol Bldg., Des Moines.

MAINE: Portland, March 12-13. Sec., Board of Registration of Medicine, Dr. Adam P. Leighton, 192 State St., Portland.

MASSACHUSETTS: Boston, March 12-14. Sec., Board of Registration in Medicine, Dr. Stephen Rushmore, 413-F State House, Boston.

MICHIGAN: Ann Arbor and Detroit, June 12-14. Sec., Dr. J. Earl McIntyre, 202-4 Hollister Bldg., Lansing.

MINNESOTA: Minneapolis, Jan. 16-18. Sec., Dr. Julian F. Du Bois, 350 St. Peter St., St. Paul.

MONTANA: *Reciprocity.* Helena, April 1. *Examination.* Helena, April 2-3. Sec., Dr. S. A. Cooney, 216 Power Block, Helena.

NEVADA: *Reciprocity with oral examination.* Carson City, Feb. 5. Sec., Dr. Frederick M. Anderson, 215 N. Carson St., Carson City.

NEW HAMPSHIRE: Concord, March 14-15. Sec., Dr. T. P. Burroughs, State House, Concord.

NEW JERSEY: Trenton, June 18-19. Sec., Dr. Earl S. Hallinger, 28 W. State St., Trenton.

NEW MEXICO: Santa Fe, April 8-9. Sec., Dr. Le Grand Ward, 135 Sena Plaza, Santa Fe.

NEW YORK: Albany, Buffalo, New York and Syracuse, Jan. 29-Feb. 1. Chief, Bureau of Professional Examinations, Mr. Herbert J. Hamilton, 315 Education Bldg., Albany.

OREGON: *Basic Science.* Portland, Feb. 24. *Applications must be on file not later than Feb. 7.* Sec., State Board of Higher Education, Mr. Charles D. Byrne, University of Oregon, Eugene.

PUERTO RICO: Santurce, March 5. Sec., Dr. O. Costa Mandry, Box 3854, Santurce.

SOUTH DAKOTA: Pierre, Jan. 16-17. Dir., Medical Licensure, Dr. G. J. Van Heuvelen, State Board of Health, Pierre.

TEXAS: June 20-22. Sec., Dr. T. J. Crowe, 918-20 Mercantile Bldg., Dallas.

VERMONT: Burlington, Feb. 13-15. Sec., Board of Medical Registration, Dr. W. Scott Nay, Underhill.

WASHINGTON: *Basic Science.* Seattle, Jan. 11-12. *Medical.* Seattle, Jan. 15-17. Acting Dir., Mr. Dave S. Cohn, Olympia.

WEST VIRGINIA: Charleston, March 4-6. Sec., Public Health Council, Dr. Arthur E. McClue, State Capitol, Charleston.

WISCONSIN: Madison, Jan. 9-11. Sec., Dr. E. C. Murphy, 314 E. Grand Ave., Eau Claire.

WYOMING: Cheyenne, Feb. 5. Sec., Dr. M. C. Keith, Capitol Bldg., Cheyenne.

## Connecticut July Examination

Dr. T. P. Murdock, secretary, Connecticut Medical Examining Board, reports the written examination held at Hartford, July 11-12, 1939. The examination covered ten subjects and included seventy questions. An average of 75 per cent was required to pass. Forty candidates were examined, twenty-one of whom passed and nineteen failed. The following schools were represented:

| School | PASSED | Year Grad. | Per Cent |
|---|---|---|---|
| Georgetown University School of Medicine | | (1939) | 81.5 |
| State University of Iowa College of Medicine | | (1937) | 77.8 |
| University of Maryland School of Medicine and College of Physicians and Surgeons | | (1937) | 78.1 |
| Harvard Medical School | | (1937) | 75.3, 77.1 82.5 |
| Tufts College Medical School | | (1938) | 75, 77.1* |
| Columbia University College of Physicians and Surgeons | | (1939) | 75, 75.8, 76.9* |
| Cornell University Medical College | | (1939) | 78 |
| Long Island College of Medicine | | (1936) | 76.7 |
| New York University College of Medicine | | (1939) | 79.2 |
| Temple University School of Medicine | | (1937) | 76.7, 80 |
| University of Vermont College of Medicine | | (1939) | 77.2 |
| Marquette University School of Medicine | | (1939) | 75 |
| Medizinische Fakultät der Universität Wien | | (1937) | 75.6, 75.8* |
| Osteopath | | (1932)† | |

| School | FAILED | Year Grad. | Per Cent |
|---|---|---|---|
| Loyola University School of Medicine | | (1939) | 72 |
| Tufts College Medical School | | (1938) | 72.1 |
| Duke University School of Medicine | | (1936) | 67.9 |
| Medizinische Fakultät der Universität Wien | | (1913) (1927) 73, (1934) 64.7 | 67.8, |
| Deutsche Universität Medizinische Fakultät, Prag | | (1936) | 72.6 |
| Eberhard-Karls-Universität Medizinische Fakultät, Tübingen | | (1922) | 65.9 |
| Friedrich-Alexanders-Universität Medizinische Fakultät, Erlangen | | (1934) | 65.3 |
| Friedrich-Wilhelms-Universität Medizinische Fakultät, Berlin | | (1921) | 73.7 |
| Johann Wolfgang Goethe-Universität Medizinische Fakultät, Frankfurt-am-Main | | (1938) | 62.8 |
| Schlesische-Friedrich-Wilhelms Universität Medizinische Fakultät, Breslau | | (1922) | 71.9 |
| Universität Heidelberg Medizinische Fakultät | | (1933) | 69.9 |
| National University of Athens School of Medicine | | (1930) | 55.2 |
| Regia Università degli Studi di Bologna. Facoltà di Medicina e Chirurgia | | (1937) | 61.3 |
| Regia Università di Napoli Facoltà di Medicina e Chirurgia | | (1936) 67.5, (1937) | 68.8 |
| Université de Genève Faculté de Médecine | | (1938) | 70.2 |
| Osteopath | | (1933)‡ | |

Thirty-two physicians were licensed by endorsement on July 26. The following schools were represented:

| School | LICENSED BY ENDORSEMENT | Year Grad. | Endorsement of |
|---|---|---|---|
| Stanford University School of Medicine | | (1937) | California |
| Yale University School of Medicine | | (1934), (1936), (1937, 2) | N. B. M. Ex. |
| George Washington University School of Medicine | | (1934)* | New York |
| Georgetown University School of Medicine | | (1936) | N. B. M. Ex. |
| State University of Iowa College of Medicine | | (1936) | N. B. M. Ex. |
| Johns Hopkins University School of Medicine | | (1935) | Maryland |
| University of Maryland School of Medicine and College of Physicians and Surgeons | | (1936) | Maryland |
| Harvard Medical School | | (1926)* (1934) New York, (1935) Massachusetts, (1936, 2) | N.B.M.Ex., N. B. M. Ex. |
| Tufts College Medical School | | (1935) Maine, (1937, 2) | N. B. M. Ex. |
| St. Louis University School of Medicine | | (1937) | N. B. M. Ex. |
| Columbia University College of Physicians and Surgeons | | (1925) | New York |
| Cornell University Medical College | | (1912), (1934)* | New York |
| Fordham University School of Medicine | | (1919)* | New York |
| Long Island College Hospital | | (1925) | New York |
| University of Cincinnati College of Medicine | | (1929) | Ohio |
| University of Pennsylvania School of Medicine | | (1932) (1934) Pennsylvania | N. B. M. Ex., |
| University of Vermont College of Medicine | | (1938) | N. B. M. Ex. |
| University of Virginia Department of Medicine | | (1932)* | Virginia |
| Marquette University School of Medicine | | (1939) | N. B. M. Ex. |
| University of Wisconsin Medical School | | (1936) | California |
| McGill University Faculty of Medicine | | (1937) | N. B. M. Ex. |

* Licenses have not been issued.

† Examined in medicine and surgery and certified in surgery. License has not been issued.

‡ Examined in medicine.

## Arizona Reciprocity Report

Dr. J. H. Patterson, secretary, Arizona State Board of Medical Examiners, reports three physicians licensed by reciprocity Oct. 4, 1939. The following schools were represented:

| School | LICENSED BY RECIPROCITY | Year Grad. | Reciprocity with |
|---|---|---|---|
| Tulane University of Louisiana School of Medicine | | (1933) | Louisiana |
| University of Michigan Medical School | | (1926) | Michigan |
| St. Louis University School of Medicine | | (1925) | Missouri |

## District of Columbia November Report

Dr. George C. Ruhland, secretary, Commission on Licensure, reports the written examination held by the District of Columbia Board of Examiners in Medicine and Osteopathy, at Washington, Nov. 13-14, 1939. The examination covered nine subjects and included sixty questions. An average of 75 per cent was required to pass. Nineteen candidates were examined, all of whom passed. Eleven physicians were licensed by endorsement. The following schools were represented:

| School | PASSED | Year Grad. | Per Cent |
|---|---|---|---|
| George Washington University School of Medicine | | (1936) (1938) 75.9, 81.1, 83.3, 87.3 | 79.4, 80.3, |
| Georgetown University School of Medicine | | (1938) | 79.1, 82.4 |
| Howard University College of Medicine | | (1937) | 75, 77.5 |
| Loyola University School of Medicine | | (1933) | 83.4 |
| University of Maryland School of Medicine and College of Physicians and Surgeons | | (1938) | 82.1 |
| University of Michigan Medical School | | (1932) | 80.4 |

| | | |
|---|---|---|
| University of Oregon Medical School | (1936) | 88.2 |
| University of Pennsylvania School of Medicine | (1938) | 81 |
| Medical College of the State of South Carolina | (1938) | 81.1 |
| Meharry Medical College | (1938) | 78.7 |
| University of Alberta Faculty of Medicine | (1929) | 82.3 |
| University of Toronto Faculty of Medicine | (1935) | 80.6 |

LICENSED BY ENDORSEMENT

| School | Year Grad. | Endorsement of |
|---|---|---|
| George Washington University School of Medicine | (1938, 3) | N. B. M. Ex. |
| Georgetown University School of Medicine | (1937, 2), (1938) | N. B. M. Ex. |
| Northwestern University Medical School | (1934) | N. B. M. Ex. |
| Johns Hopkins University School of Medicine | (1937) | N. B. M. Ex. |
| Boston University School of Medicine | (1937) | N. B. M. Ex. |
| New York University College of Medicine | (1938) | N. B. M. Ex. |
| University of Vermont College of Medicine | (1931) | N. B. M. Ex. |

# Book Notices

**Pulmonary Tuberculosis: Pathology, Diagnosis, Management and Prevention.** By George Gregory Kayne, M.D., M.R.C.P., D.P.H., Tuberculosis Medical Officer, Middlesex County Council, Walter Pagel, M.D., Pathologist, Papworth Village Settlement, and Laurence O'Shaughnessy, M.D., F.R.C.S., Consulting and Thoracic Surgeon to Preston Hall, City of Birmingham Tuberculosis Scheme, Nottinghamshire County Council and the Grosvenor Sanatorium. Cloth. Price, $13. Pp. 565, with 259 illustrations. New York, Toronto & London: Oxford University Press, 1939.

Dividing the material into the major chapters on pathology, diagnosis, prognosis, management, epidemiology and prevention, the authors have done a perfect job in simplification of the subject and in its presentation. The chapters are splendidly illuminated with charts, microscopic and macroscopic illustrations, diagrams, tables, reproductions of x-ray plates, everything, in short, that is necessary for thorough visualization of the subject. Many references are made to the American medical literature and, thanks to the influence of the International Union Against Tuberculosis, the nomenclature is ours. It is regrettable that the influence of the union and of scientific internationalization in general is hindered by disturbed world conditions, by wars and rumors of war, which canceled the meeting at Lisbon two years ago and the meeting in Berlin this year. Each chapter in the book is excellently supplemented by subject summary, by references, by additional bibliography and, in the case of the chapter on management of pulmonary tuberculosis, by an appendix of charts and illuminating diagrams, and finally by a comprehensive index of subjects and personal names. As was to be expected from the purpose of the contribution and the scope of the material, the text presents nothing really new. The set-up, however, is beautiful; the style is good and easy to read. The authors have done an excellent job of simplifying and connecting to a coherent whole the subject of tuberculosis. Their purpose was to present a book for the tuberculosis specialists and the private practitioners rather than a textbook for medical students. The purpose has been well fulfilled. There are, of course, certain disappointments that detract somewhat from an otherwise excellent work. Among these may be mentioned lack of stress on the public health angle of collapse therapy and some misconceptions concerning BCG. It was stated, for instance, that BCG is not used in America, with one exception. This is not correct. In America BCG is used in New York, Philadelphia, Nashville, Chicago and Montreal. It is similarly unfortunate, in view of present day interest, that the multiple scarification method of administration of the vaccine was not given. It is held much to the credit of the authors that they take a definite stand in the various controversial problems in tuberculosis.

**Primitive Tuberculosis.** By S. Lyle Cummins, C.B., C.M.G., M.D., Director of Research, Welsh National Memorial Association. Cloth. Price, 10s. 6d. Pp. 213, with illustrations. London: John Bale Medical Publications, Ltd., 1939.

Cummins is probably better qualified than any other living specialist to write on the subject of his text, and he reminds one of Colonel Bushnell's earlier fancy and almost uncanny interpretations from the realm herewith brought down to date. The narrative is filled with interesting information and is delightful reading. In the preface he notes that "Primitive Tuberculosis" is apt to come as an anticlimax or even as an irrelevance to many engaged in the more vivid sections of the vast subject of tuberculosis. Yet the subject ought to have an interest for all, if only life were long enough and time an element to be enjoyed rather than an enemy to be dealt with. His hope is that this little book may awaken this interest in the minds of many who have not had any opportunity of first hand study of the disease abroad. His first chapter, which is well chosen, dwells on wild and domestic life in relation to tuberculosis. In this he demonstrates the simple expedient of placing a glass front to the monkey cages in the zoo to exclude sputum and infection from human beings. He points out that even in domesticated animals it is only among those whose state of existence is intensely modified to suit the needs and habits of men that the disease is at all common. He believes that what is true of the animal world in general must also be true of man and in the subsequent chapters he discusses the problem as it is applicable to the various types of cultural community of the human race.

The term "primitive" as applied to a section of the human race he believes inexpedient to define too exactly. Yet one cannot well use the word "native" as an alternative, since every national or tribal entity is "native" on its own soil. On the whole it is best to specify it by its name when writing of any particular tribe or race and to resort to the word "primitive" as many others have done when dealing with the problem as a general one. The word is not interchangeable with "isolated" though, to remain "primitive" to any considerable degree, a community must be "isolated" to some extent or in some way for practical purposes. The author's careful treatment of the various phases of "primitive tuberculosis" is entertainingly taken up in twenty-four chapters including subjects on the native outlook, tuberculosis of Africans, the tuberculin test, report on native miners, gold mining industry, Africans by descent or American Africans and tuberculosis in India; and, to add to one's fascination, the prophylaxis by means of BCG and theories to explain differences in susceptibility are taken up with careful consideration. A bibliography of about twelve pages and 180 references is appended. The general trends of this volume may be gleaned from some of the points made in the last, twenty-fourth, chapter of conclusions, given herewith:

Tuberculosis will always be the enemy of primitive races and will take its toll the more heavily the more rapid is their emergence from primitive to civilized conditions. In the majority of cases the response of the community will be relatively severe and the natives will pay for their "virginity" to tuberculosis by the large number of people contracting the disease and dying from it within a short time. The outbreak will bear some resemblance to what we see at home. . . . But the changes produced by the disease will be of the type characteristic of such communities, a generalized and diffuse type which is distinguishable from what we see in European hospitals. As things are going, the natural laws that govern bacterial infections appear to be militating against tuberculosis in our midst. One thing is certain: that the child, whether in our own race or in the primitive, is alike in having no acquired immunity. The type of disease is similar in the two when disease ensues. Disease nearly always ensues in the Negro infant, whereas it is the common experience of our race to bring up healthy but tuberculin-positive children. One must talk with reference to averages and, while it is possible to produce exceptional cases, it is easy for the infant of tried stock to elaborate immunity and overcome his infection on the average whereas it is hard for the primitive child to do so. In no country is the infant born with immunity. But the infant of European type usually passes on to a tolerance of the infection and goes through life without disease, whereas the infant of primitive blood is likely to die of natural tuberculosis if infected, and even the adult exposed to infection usually gets it after the manner of a child.

Whether one agrees with the author's conception of immunity or whether one follows the other school of increased susceptibility subsequent to infection, there comes a time when a book is very worth while reading, and this is such a volume. Each chapter will be enjoyed with increasing interest. The English is British or, more specifically, Welsh in character, but even this is attractive as being a little different from American English. The type is pleasing and readable, and the book is buckram bound of a size adapted to pocket transport. It should attract all interested in medicine and health in general.

**Œuvres de Pasteur.** Réunies par Pasteur Vallery-Radot, professeur agrégé à la Faculté de médecine de Paris. Tome VII: Mélanges scientifiques et littérairies. Table des noms cités. Table chronologique. Index analytique et synthétique de l'œuvre de Pasteur. Paper. Price, 200 francs. Pp. 666. Paris: Masson & Cie, 1939.

This the seventh and last volume of Pasteur's collected works contains communications and scientific notes on diverse subjects, reports to the Counseil d'hygiene, articles and notes relative to teaching at the Ecole normale superieure, and lessons in physics and chemistry as applied to art (Pasteur was professor for some time at the Ecole des beaux-arts). At the beginning of the volume are three remarkable letters by Pasteur (1862, 1863, 1867) which show that at that time he realized the larger significance of his researches on fermentation. A good many of the items in this volume, some of special importance, are published for the first time. There is an alphabetical table of the names cited in the seven volumes and a chronologic table of Pasteur's publications. At the end is a valuable detailed analytic and synthetic index of Pasteur's writings, prepared by the editor, Pasteur Vallery-Radot, which facilitates finding what Pasteur has written on this or that subject, including certain topics, e. g. toxins, germ carriers and microbic association, which currently are regarded as of postpasteurian development. All told, the seven stately volumes contain more than 4,200 printed pages. Their publication is a fine achievement. The work of the editor is uniformly excellent. The works of Pasteur have been given an appropriate and worthy permanent form.

**The Science and Art of Joint Manipulation.** By James Mennell, M.A., M.D., B.C., Consulting Physicotherapist, St. Thomas's Hospital, London. Vol. 1: The Extremities. Cloth. Price, $4.50. Pp. 233, with 284 illustrations. Philadelphia: P. Blakiston's Son & Co., Inc., 1939.

It is not an easy task to present a subject as controversial as is the question of manipulative surgery to the circle of a critical profession. Mennell, in his latest book, has done so rather convincingly. Because of the careful restraint with which he handles physiologic and anatomic facts as a background for his indications, there is no tendency to admit any fantastic or forced theories into his field of reasoning. In the introductory chapters, which are devoted to the mechanical aspect of joint disorders, little was found to which exception could be taken on theoretical grounds, and there was much which is excellent. Then also there is a great deal of clinical material adduced, accurately observed and keenly interpreted, particularly in chapter III on referred pain. The actual technic of manipulations of joints occupies a large portion of the book and is so replete with details that it must be read entire and not in abstract. This pertains to the movements of the digital joints, the carpal and metacarpal joints, elbow, shoulder, the metatarsophalangeal joint, the ankle, the tibia and the knee. As may be expected, the shoulder and knee joint are most thoroughly discussed, but each of the joints is generously treated in special chapters. The manipulation of the back is left to a special volume. The book is written in clear, precise language, calmly, without pedagogic vehemence and without pretense. It contains a wealth of information and, even for those who are disinclined to accept the principle of manipulation treatment, it is a mine of useful information.

**Diet in Health and Disease.** Edited by Sir Humphry Rolleston, Bt., G.C.V.O., K.C.B., M.D., and Alan A. Moncrieff, M.D., F.R.C.P. Published on behalf of The Practitioner. Cloth Price, 14s Pp 382. London: Eyre & Spottiswoode, Ltd., 1939.

This volume consists of a number of essays on dietetic subjects. In the introduction E. P. Cathcart discusses the importance of the diet in the management of the sick and observes that there might be some advantage to the variations in the daily food intake which undoubtedly occur in daily life. "No one," says he, "except in the most exceptional of circumstances, would advocate keeping an individual in a room of relatively high uniform temperature. Change and variety, generally speaking, are physiologically sound." The twenty-eight chapters discuss such problems as practical dietetics, sickroom menus and recipes, the dispensing of special diets, diets in the treatment of acute fevers, pulmonary tuberculosis, gastric diseases, constipation and other intestinal disorders, diseases of the liver and biliary system, endocrine disorders, diabetes mellitus, disorders of the cardiovascular system, kidney disease, nervous and mental disorders, allergic conditions, dermatologic diseases, rheumatism and gout, and diet in pregnancy and lactation, childhood and old age. The diet in convalescence and in different seasons is also discussed in brief fashion. There are brief essays also on alcohol and on the effect of cooking on food. This volume will be of interest not only to the practitioner but also to the student of nutrition. So little knowledge is established about the value of dietetics in certain diseases that the prevailing opinion of medical experts, even though this may be only an enlightened empiricism, shows the need for further investigation as well as offers suggestions to the intelligent reader on the trend such investigation might take.

**Stations de cure de l'U. R. S. S. Recueil d'articles basés sur les matériaux de l'Institut central de balnéologie à Moscou.** Sous la rédaction de I. A. Pertsov. Cloth. Pp. 270, with illustrations. Moscow: Société de relations culturelles entre l'U. R. S. S. et l'étranger, 1938.

This is a small volume in French issued by the Central Institute of Balneology in Moscow with the aim of presenting the recent developments in climatologic and balneologic therapy in Russia. As is well known, the climatic and mineral water resources of Russia are many and varied. There are, according to this monograph, more than 2,500 localities, each exhibiting a particular medicinal advantage. The spas of the Caucasus are famous for their mineral water, which may be radioactive, carbonated, sulfurated, ferruginous or thermal. The "naphthalan" treatment and the "koumiss" treatment for tuberculosis are particularly Russian. The author stresses the point that balneologic therapy in Russia is one link in the chain of prophylactic medical measures aiming to improve the health of the workers. The development of balneology has been the result of a unified central plan. The Central Institute of Balneology in Moscow, with its local branches, supervises the research and clinical studies of the problems in connection with the various climates and waters. The patient is referred for a special treatment by his dispensary physician or by the clinic, and the treatment is paid for by the syndicate, the union or the social insurance. The treatment includes, in addition to the use of water or mud baths, physical exercises, physical therapy and special dietetic regimens. Among the model sanatoriums the author mentions that of Sochi-Matsesta in the Crimea and the Artek Colony for Children situated on the southern shore of the Crimea. The information contained in the monograph is of sociologic rather than scientific value. The reader can obtain from it a good general idea of what has been accomplished along these lines under the Bolshevik régime.

**Minor Mental Maladjustments in Normal People Based on Original Autobiographies of Personality Maladjustments: A Casebook for the Use of Students of Mental Hygiene, Psychology, Education, Child Development, Sociology, and the Formation of Personality Traits.** By J. E. Wallace Wallin, Ph.D., Director of Division of Special Education and Mental Hygiene of the Delaware State Department of Public Instruction and the Wilmington Public Schools. Cloth. Price, $3. Pp. 298. Durham, North Carolina: Duke University Press, 1939.

This is essentially a casebook containing original autobiographies of cases of maladjustment. The book first introduces the topic by a general consideration, following it with some cases and an insight as to methods of analysis. Then come reports of actual cases which are concerned with fears and phobias, with dreams, somnambulism, emotional disturbances, physical handicaps, and attitudes. The cases are neatly presented with suitable illustrations. As a storehouse of autobiographic material, the material will be exceedingly useful to teachers and writers, who will find the information of value.

**Medical Occupations for Girls: Women in White.** By Lee M. Klinefelter. Cloth. Price, $2. Pp. 320, with 59 illustrations. New York: E. P. Dutton & Co., Inc., 1939.

The author of this book has also written on occupations for boys under "Medical Occupations for Boys." "Medical Occupations for Girls" includes not only medicine and its specialties but also dentistry, chiropody, medical technology, nursing, occupational therapy, optometry, pharmacy, physical therapy and x-ray technic. The author writes the book as if he were a physician giving information to girls. Unfortunately the author is not really familiar with many of the aspects of modern medical education and in occasional places he has departed some-

what from fact. Thus he gives the impression that a woman can get into most of the medical schools of the United States on about the same basis as a man. It would have been much more honest to say that the number of women admitted is exceedingly limited and that the chances of women getting into medicine are not nearly so great as those of a man. In the same way, it is suggested that women are equally well adapted for most of the medical specialties. Yet there are few who have done well in urology or orthopedic surgery.

If there is any fault to find with this volume it is concerned with its optimism. Nevertheless, the young girl who is trying to make up her mind as to the various fields of medical interest in which she might become employed will find much that is of interest and value in this book.

**Essentials of Physiological Chemistry.** By Arthur K. Anderson, Ph.D., Professor of Physiological Chemistry, The Pennsylvania State College, State College, Pa. Second edition. Cloth. Price, $2.75. Pp. 323, with 36 illustrations. New York: John Wiley & Sons, Inc.; London: Chapman & Hall, Limited, 1939.

This elementary textbook on the fundamentals of biochemistry is intended especially for use by students of home economics. Accordingly it has been designed to furnish a background for courses in dietetics and nutrition. The book fulfils its purpose exceedingly well. The material in each chapter is presented in didactic style with a minimum of names of investigators and with little information about the experimental procedures which have led to the conclusions given. Doubtless this method of presentation is necessary for an elementary course. There are two or three references at the end of each chapter to other books on the subject. The volume fulfils its purpose of providing the essentials of chemical physiology that are required for a further study of nutrition by college students.

**Recherches sur l'embryologie du système nerveux central de l'homme.** Par André Barbé, médecin de la Salpêtrière. Préface de A. Souques. Paper. Price, 250 francs. Pp. 340, with 275 illustrations. Paris: Masson & Cie, 1938.

The author of this large and lavishly illustrated book had fifty-two human fetuses available for study. He systematically photographed, cut and stained the central nervous system of forty-four of them, although the great majority were so poorly preserved as to be worthless even for gross study. He seems to be quite unaware of the splendid monographs of Hochstetter and Streeter, which are based on normal, admirably preserved and prepared human material; indeed, the only original contributions to which he refers are the papers of Wilhelm His. He fails consequently to recognize as such the distortions of postmortem maceration and other artefacts. A few of the older specimens, prepared by a silver method, are worth describing, but one looks in vain for new details and for the answers to important questions which they might have given us. It is sad to see so much space and printers' ink wasted at the present time, when much important descriptive work can be published only in abstract.

**Nitrous Oxide-Oxygen Anesthesia: McKesson-Clement Viewpoint and Technique.** By F. W. Clement, M.D., Director of Anesthesia at Flower Hospital, The State Hospital for the Insane, Lucas County Hospital, Toledo Dental Dispensary, Toledo, Ohio. Cloth. Price, $4. Pp. 274, with 70 illustrations. Philadelphia: Lea & Febiger, 1939.

As the author says, "This book is an attempt on the part of the author to reproduce and preserve the teachings and findings of the 'Master' [Dr. E. I. McKesson], as well as his own impressions and experiences resulting from the use of nitrous oxide-oxygen over a period of many years." It is fortunate for those who have occasion to anesthetize with nitrous oxide-oxygen to have available in book form the technics employed by Drs. McKesson and Clement.

The book is no doubt designed for those readers who have occasion from time to time to refer to it for information on the management of patients for various types of operations. No doubt this explains the work's frequent repetition of the fundamental steps employed in the administration of nitrous oxide-oxygen in the many types of operations in which it can be used.

Subjects discussed are charting the patient's condition, interpretation and treatment of shock, premedication and the use of carbon dioxide. A comparison is made between nitrous oxide and oxygen with ethylene, cyclopropane and the mixture nitrous oxide-oxygen-ether. Use of the endotracheal catheter is advocated. The carbon dioxide absorption technic is discussed. The use of nitrous oxide-oxygen for dental anesthesia and analgesia is discussed at length, and a paper by Dr. McKesson is appended which relates the development of his type of gas machine and the reasons why it is allegedly better than others. This book is particularly valuable because of the enormous clinical experience and the high degree of skill of the author, both of which are reflected in the volume.

**A Textbook of Microbiology.** By Kenneth L. Burdon, Ph.B., Sc.M., Ph.D., Assistant Professor of Immunology and Bacteriology, Louisiana State University School of Medicine, New Orleans. Second edition of "A Textbook of Bacteriology." Fabrikoid. Price, $2.75. Pp. 638, with 103 illustrations. New York: Macmillan Company, 1939.

The recent rapid advances in certain fields included in the science of microbiology necessitate frequent revision of textbooks and somewhat tax the ingenuity of authors in attempting to present new material to elementary students. This is particularly true in the field of viruses. The author of this book has rewritten and enlarged an earlier volume, intended primarily for nurses, in order to include college students as well as to bring the text in line with modern developments. This book differs from others intended for the same purpose mainly in an attempt to discuss the bacteriology of diseases on the basis of "the region of the body principally affected." While this may be fundamentally sound, it is obvious that certain arbitrary groupings must be made. Meningitis is discussed with eye and ear infections and tuberculosis is assigned a separate chapter. Undulant fever is classed with diseases acquired from animals, and virus diseases are divided between infections of the respiratory tract and a discussion of their own. The book is excellently written. Although it certainly includes more material than can possibly be presented in the usual nurse's course, it does not contain too much for elementary college or premedical study.

**Post-Mortem Appearances.** By Joan M. Ross, M.D., B.S., M.R.C.S., Reader in Pathology, University of London, London. Fourth edition. Cloth. Price, $2.50. Pp. 275. New York & London: Oxford University Press, 1939.

The fourth edition of this book forms a useful compendium of information difficult to obtain from any other single source. The general practitioner occasionally called on to perform his own necropsies will receive much information to aid his task.

Gross changes are described in deaths from all causes and are conveniently grouped under ten headings, including the main systems, infections and death from causes other than disease. The new chapter on examination of stillbirths and neonatal deaths deserves favorable comment.

The description of procedure in postmortem examinations offers a primary incision from the symphysis menti to the symphysis pubis, which, for cosmetic reasons, is less desirable than the pectoral V incision practiced in this country.

The appendix contains a useful group of tables including organ weights, fetus weights and lengths, fetal age, ossification centers and tooth eruption. Students, interns and residents will find this a small, handy book for quick reference.

**Cirurgia do megaesôfago.** Por Edmundo Vasconcelos, professor de técnica cirúrgica e cirurgia experimental da Faculdade de medicina da Universidade de S. Paulo, e Gabriel Botelho, assistente de técnica cirúrgica e cirurgia experimental da Faculdade de medicina da Universidade de S. Paulo. Paper. Pp. 434, with 150 illustrations. São Paulo: Companhia Editora Nacional, 1937.

In an elaborate monograph the authors discuss in detail the subject of mega-esophagus or cardiospasm. The various theories of the causation of the disease are well considered. Since the generally accepted theory of the etiology of cardiospasm surmises that it is the result of disturbance in the nerve supply of the esophagus, the chapter on enervation is particularly interesting. The physiology of the normal esophagus and cardia is discussed at length. Experimental studies in the production of the disease in animals are completely considered. More than a hundred pages is devoted to the types of treatment that have been employed in the management of the disease, and the various types of plastic operations and expanding dilators are discussed

in detail. The volume is profusely illustrated with roentgenograms, drawings and photographs. There is one drawing of the esophagus in color showing areas of leukoplakia and ulceration in cardiospasm that is especially interesting. The bibliography is quite complete and consists of more than 600 references. In reviewing the bibliography it is not quite apparent why the article by Russell describing the original hydrostatic dilator has been omitted. The mechanical preparation of the book is splendid; the type is very readable and the printing is done on heavy glazed paper, which makes the volume most attractive.

**The Art of Anaesthesia.** By Paluel J. Flagg, M.D., Consulting Anaesthetist to St. Vincent's Hospital, New York, N. Y. Sixth edition. Cloth. Price, $6. Pp. 491, with 161 illustrations. Philadelphia, Montreal & London: J. B. Lippincott Company, 1939.

The author, speaking as one who has authority, defends his evident opinion that ether is the anesthetic of choice in almost all cases. He describes his technics, the devices which he has invented for the administration of ether and also his equipment for intratracheal anesthesia and for resuscitation. Instructions and advice are on a broad plane and are stated in generalities. For those who are anxious to follow Dr. Flagg's technics, the book will be well received.

**Nouveau traité de psychologie.** Par Georges Dumas, professeur à la Sorbonne. Tome VI: Les fonctions systématisées de la vie affective et de la vie active. Avec la collaboration de L. Dugas et al. Cloth. Price, 125 francs. Pp. 545, with 34 illustrations. Paris: Félix Alcan, 1939.

This volume of a systemic survey of psychology continues the series of excellent presentations. The work is thorough and adequately presents diverse points of view. Although this volume is concerned with the emotions, it does not utilize psychopathology, which furnishes considerable data from which psychologists could profitably learn much about emotions.

# Bureau of Legal Medicine and Legislation

## MEDICOLEGAL ABSTRACTS

**Compensation of Physicians: Liability of Third Person for Medical and Hospital Services Rendered at His Request.**—Morris was injured while doing farm work for the defendant. The following day the plaintiff was called on to attend the injured man. As to whether or not the defendant called him, the evidence was conflicting. According to the plaintiff physician's testimony, however, the defendant on the following day told him to render such medical treatment and provide such hospitalization as might be necessary and that he would pay for them. The plaintiff then removed Morris to his hospital. There he again examined him and made roentgenograms, an interpretation of which was given to the defendant at that time. On that occasion, according to the plaintiff's testimony, which was corroborated by that of another physician, a dentist and a nurse, the defendant again promised to pay for such services as might be rendered. The plaintiff physician entered on his account books, against the defendant, all charges for services rendered to Morris. He received from the defendant several payments by checks, in some of which he was named as payee. On June 14, in response to a statement of account, he received from the defendant another check on which appeared the notation "H. Morris Acct." Thereafter the defendant disclaimed responsibility for the medical and hospital services rendered to Morris, and the plaintiff instituted this suit to recover the balance due for those services. At the trial, the defendant denied that he had requested the plaintiff to render the services which he had rendered to Morris or that he had promised to pay for them. He offered evidence to show that the amounts which he had paid to the plaintiff had been deducted from the wages of Morris, which he continued to pay during Morris's period of disability. The jury, in a special verdict, found that on March 28 the defendant requested the plaintiff to render such medical and hospital services as were necessary but that he did not promise to pay for them. The trial court concluded that the circumstances showed an intention on the part of the defendant to pay for such services and that the plaintiff so understood. It therefore held the defendant liable on an implied contract and rendered judgment for the plaintiff. The defendant thereupon appealed to the Supreme Court of Wisconsin.

The defendant contended that in the absence of an express contract he could not be held liable for the medical and hospital services rendered to Morris at his request, since he was not legally bound to furnish such services. The Supreme Court, however, thought otherwise. As a general rule, it said, the law will not raise an implied promise to pay on the part of a person who requests a physician to render services to another unless the relation of that person to the patient is such as to put him under a legal obligation to provide the medical services requested. If there is proof of circumstances, however, including the acts and conduct of the person who calls the physician, sufficient to establish an intention on the part of that person to pay, the general rule does not apply. In the judgment of the Supreme Court, the trial court correctly refused to apply the general rule in this case.

Judgment in favor of the plaintiff physician was affirmed.—*Andrew v. Brecker (Wis.), 282 N. W. 609.*

**Evidence: Court Will Not Take Judicial Notice of Efficacy of So-Called Lie Detector.**—The defendant was prosecuted for homicide. At the trial a ballistic expert testified that in his opinion the two bullets that killed the deceased had been fired from a revolver which was found on the defendant at the time of his arrest. After all the evidence had been produced for the jury's consideration the defendant's counsel moved that the case be reopened to permit him to cause the defendant to be examined "under the pathometer, commonly known as the 'lie detector.'" The motion was denied. The defendant was convicted of first degree murder and thereupon appealed to the Court of Appeals of New York.

The only objection offered by the defendant that the Court of Appeals thought might reasonably have affected the verdict of the jury had reference to the refusal of the trial court to reopen the case to permit the defendant to be subjected to examination under the so-called lie detector. But, said the court, we cannot take judicial notice that this instrument is or is not effective for the purpose of determining the truth. The court questioned whether it could be depended on to operate with complete success on persons of varying emotional stability. The record, the court pointed out, was devoid of evidence tending to show a general scientific recognition that the device referred to as the pathometer was efficient. Until it was demonstrated that the device was recognized by experts as possessing such value that reasonable certainty would follow tests made under it, it could not be held as a matter of law that the trial court had erred in refusing to allow the defendant to experiment with it. The judgment of conviction was affirmed.—*People v. Forte (N. Y.), 18 N. E. (2d) 31.*

# Society Proceedings

## COMING MEETINGS

American Academy of Orthopedic Surgeons, Boston, Jan. 21-25. Dr. Carl E. Badgley, 1313 East Ann St., Ann Arbor, Mich., Secretary.
American Orthopsychiatric Association, Boston, Feb. 22-24. Dr. Norvelle C. La Mar, 149 East 73d St., New York, Secretary.
Annual Congress on Industrial Health, Chicago, Jan. 15-16. Dr. C. M. Peterson, 535 North Dearborn St., Chicago, Secretary.
Annual Congress on Medical Education and Licensure, Chicago, Feb. 12-13. Dr. W. D. Cutter, 535 North Dearborn St., Chicago, Secretary.
Middle Section, American Laryngological, Rhinological and Otological Society, Kansas City, Mo., Jan. 19. Dr. Sam E. Roberts, Professional Bldg., Kansas City, Mo., Chairman.
Society of Surgeons of New Jersey, Camden, Jan. 31. Dr. Walter B. Mount, 21 Plymouth St., Montclair, Secretary.
Southern Section, American Laryngological, Rhinological and Otological Society, Columbia, S. C., Jan. 8-9. Dr. Walter J. Bristow, Doctors Bldg., Columbia, S. C., Chairman.
Western Section, American Laryngological, Rhinological and Otological Society, Los Angeles, Jan. 26-27. Dr. Pierre Viole, 1930 Wilshire Blvd., Los Angeles, Chairman.

# Current Medical Literature

## AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1930 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but may be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

### American Journal of Cancer, New York

**37:** 173-328 (Oct.) 1939. Partial Index

*Effects of 3:4-Benzopyrene on Human Skin. G. B. Cottini and G. B. Mazzone, Catania, Italy.—p. 186.
Intranuclear Inclusion Bodies in Carcinoma of Thyroid Gland. C. F. Stewart, New York.—p. 196.
Sarcoma of Trachea: Report of Two Cases. T. Weinberg, New York.—p. 201.
Hypernephroma of Ovary. F. W. Van Kirk Jr. and E. A. Edwards, Chicago.—p. 209.
Susceptibility to Transmitted Leukemia Occurring in Pure Bred and Hybrid Mice. M. D. Schweitzer and J. Furth, New York.—p. 224.
Abortifacient Action of Serum and Urine from Patients with Cancer. K. W. Thompson, T. Hale Jr. and B. B. Whitcomb, New Haven, Conn.—p. 233.
Is or Is Not Cancer Dependent on Age? F. Bernstein, Z. W. Birnbaum and S. Achs, New York.—p. 298.
Malignancy Induced by Cysticercus Fasciolaris: Its Independence of Age of Host When Infested. W. F. Dunning and M. R. Curtis, New York.—p. 312.

**Effects of 3: 4-Benzopyrene on Human Skin.**—Cottini and Mazzone point out that daily cutaneous applications to twenty-six human subjects of a 1 per cent solution of benzopyrene in benzene for variable periods (not exceeding four months) resulted in definite manifestations localized to the treated areas. Erythema, pigmentation, desquamation, the formation of verrucae and infiltration developed in chronologic order. Pigmentary and verrucous lesions were the most commonly observed changes. The assumption appears warranted that benzopyrene, if applied to human skin for protracted periods, would be carcinogenic as it is in animals.

### American Journal of Surgery, New York

**46:** 219-410 (Nov.) 1939. Partial Index

Water Balance. E. O. Latimer, Chicago.—p. 223.
Gastroscopy as Aid in Diagnosis of Carcinoma of Pancreas. H. J. Moersch and M. W. Comfort, Rochester, Minn.—p. 246.
*Appendicitis in Single Family Pedigree: Thirty-Nine Cases. T. Perry Jr. and C. E. Keeler, Boston.—p. 259.
Classification of Forearm Fractures Near the Wrist. L. E. Snodgrass, Philadelphia.—p. 266.
Acromioclavicular and Sternoclavicular Joint Injuries. N. J. Howard, San Francisco.—p. 284.
Treatment of Delayed Union or Nonunion by Bone Drilling. S. M. Leydig, St. Louis.—p. 300.
Use of Regional Nerve Block During Treatment for Fractured Ribs. E. A. Rovenstine and Mary Lou Byrd, New York.—p. 303.
*Incidence of Headache, Nausea and Vomiting Following Spinal Anesthesia. W. K. Jennings and J. E. Karabin, Evanston, Ill.—p. 317.
Surgical Problem in Peripheral Vascular Disease. G. H. Pratt, New York.—p. 321.
Selective Thoracoplasty: Results of Series of Thirty Cases. J. R. Phillips, Houston, Texas, and L. F. Knoepp, Beaumont, Texas.—p. 327.
Empyema Thoracis: Experiences in Treatment of 104 Cases Employing Double-Channel Catheter for Drainage. M. S. Lloyd, New York.—p. 334.
Treatment of Venereal Lymphogranuloma with Sulfanilamide: Preliminary Report. A. W. M. Marino, A. M. Buda, R. Turell and L. Nerb, Brooklyn.—p. 343.
Effect of Buffer of Mandelic Acid and Estrogenic Hormone in Treatment of Trichomonas Vaginalis Vaginitis. T. H. Cherry, New York.—p. 358.
Abortion as Complication of Operation in Pregnant Woman: Plea for Prophylactic Use of Progesterone. J. E. Lackner and A. S. Tulsky, Chicago.—p. 362.
*Simple Method for Determining Coagulation Time of Blood. C. F. Humbert, Kansas City, Mo.—p. 372.

**Appendicitis in Single Family Pedigree.**—Some family pedigrees supply convincing evidence that peculiarities or anomalies of the appendix are inherited as simple dominant unit characters. Such characters are (1) a missing section of the meso-appendix and (2) variations which may be described as coiled, short, long and retrocecal appendixes. It has been assumed that these bizarre morphologic forms produce appendicitis, but no one has operated on normal members of the same families to prove whether or not these persons may bear these same anatomic abnormalities throughout life with impunity. That disturbances such as tonsillitis, gallbladder disease and ulcerative colitis are occasionally present is not to be denied. It may conceivably be due to chance that some of these accompanying conditions strike persons suffering from appendicitis, and yet some cases are highly suggestive of a common cause. Perry and Keeler present a pedigree of appendicitis which is by far the most extensive yet placed on record. The households represented are comfortably situated. The stock is primarily old Yankee. The intelligence and capability are high. Knowledge of balanced diets is complete. Nervous disorders are uncommon. There have been some cousin marriages in the past in this family. The pedigree chart is a bit complicated, owing to the marriages of two brothers to two sisters. The cases of appendicitis are not distributed at random, as might be expected if no hereditary diathesis were present. On the contrary, in the upper section of the pedigree the cases occur sporadically in 6.5 per cent of the population, whereas in the lower section they occur in 35 per cent, or more than five times as frequently. This makes it apparent that some sort of hereditary diathesis is being transmitted in the lower portion of the pedigree. Sixteen men and twenty-three women are affected, which indicates that no male sex linkage exists. If the portion of the pedigree in which appendicitis is most concentrated is examined, it is found that the complex consists of the appendicitis family of one man who married into the appendicitis family of one woman. In this one family the predisposing factors appear to be lithiasis, gallstones, long or large appendixes and bent, coiled or retrocecal appendixes, which appear as hereditary characters. (It is to be understood, however, that kinking or coiling of the appendix may frequently be acquired rather than hereditary.) The authors conclude from the literature and their studies that there are a number of hereditary factors predisposing to appendicitis (some of which are inherited as irregular dominants) and that the genes for several of these predisposing physical factors are concentrated in the germ plasm of one woman and her descendants, one of whom (a man) married into another appendicitis family.

**Headache and Vomiting Following Spinal Anesthesia.**—Jennings and Karabin determined the incidence of such postlumbar anesthetic complications as headache, nausea and vomiting in 500 cases, in the majority of which rectal operations had been performed. This selection of cases was made because under ordinary conditions these complications following this type of surgical procedure are infrequent. In all, 153 patients suffered from postanesthetic headache; the headaches of sixty-seven (13.4 per cent) were considered as severe and of eighty-six (17.2 per cent) as moderate. In 143 cases the onset occurred within twenty-four hours after the lumbar puncture and in ten it occurred after twenty-four hours. Of the 453 patients who had less than 100 mg. of procaine hydrochloride, 29.6 per cent had headaches, as compared with 10 per cent of the forty-seven patients who had 100 mg. or more of the drug. One patient suffered from an almost continuous headache for seven days and has complained of frequent headaches for eight months. With this exception there have been no serious after-effects among any of the patients in the series. A neurologic consultant, after examining the patient with the recurrent headaches, stated that no evidence was present which suggested any relationship between the complaint and the spinal anesthesia. It is the authors' belief that the most satisfactory treatment of a postanesthetic headache is a prolongation of the "flat in bed" period. Nausea and vomiting (in 34.6 per cent of the patients) were encountered with greater frequency than that reported by most operators. Most of the patients in the series received morphine preliminary to subdural anesthesia, which may have accounted for some of the nausea; but a lack of control cases renders any conclusions unreliable. The fact that most of the patients had operations performed on the lower intestine undoubtedly was a factor in the high incidence of nausea. Despite the frequency of headaches, nausea and vomiting following spinal anesthesia, its wide adoption indicates its usefulness. Since this type of anesthesia relaxes the anal sphincter, for anorectal surgical intervention it is superior to all other forms of safe anesthesia except caudal-sacral block. Headaches as a complication of spinal anesthesia occur much more fre-

quently than is commonly realized. Their incidence seems to be inversely proportional to the time of recumbency. Therefore further investigation is necessary if the use of spinal anesthesia for comparatively minor surgical procedures is to continue. The authors adopted Harrison's proposal of administering dextrose solution intravenously in an effort to reduce the number of headaches, but as yet their series of patients so treated is too small to require comment.

**Determining Coagulation Time of Blood.**—Humbert outlines the method of determining the coagulation time that has been in use in the Wheatley-Provident Hospital for five years without the occurrence of a single fatality due to inaccurate determination. In carrying out the procedure the finger is cleansed and punctured in the usual manner. The first drop of blood is discarded. The second drop of blood is allowed to remain on the finger for two minutes; then the corner of a piece of absorbent paper is placed at the center of the drop of blood, and the blood is absorbed. If coagulation has started, a ring of drying blood will be seen at the periphery. The blood will coagulate there more quickly and remain adherent to the skin. If no ring is seen another drop is allowed to remain for four minutes, and the procedure is repeated. If still there is no ring, the procedure is again repeated and the period of waiting is increased until the coagulation time is determined and the safety of the operative procedure is established.

## American Review of Tuberculosis, New York

**40:** 363-486 (Oct.) 1939

Chronic Nontuberculous Basal Infections of Lungs. L. Hamman, Baltimore.—p. 363.

Laryngeal Changes in Acute Hematogenous Tuberculosis. W. H. Oatway Jr., Madison, Wis.—p. 378.

Thoracoscopy: Conservative Measure in Artificial Pneumothorax. C. G. Scarborough, San Jose, Calif.—p. 389.

Evolution of Modern Pneumothorax Machines: I. Hydrostatic and Bellows Type Machines. L. R. Davidson, Staten Island, N. Y.—p. 403.

Industry's Practice in Employment of Ex-Patients. E. Hochhauser, New York.—p. 427.

Tuberculosis Survey in Vermont. L. Rabinowitz, E. J. Rogers, Pittsford, Vt., and H. W. Slocum, Burlington, Vt.—p. 435.

*Tuberculosis in Nurses: Seven Year Study at Cook County Hospital. P. S. Rhoads, M. E. Afremow and Elizabeth C. Straus, with assistance of Dorothy L. Campbell, Chicago.—p. 444.

Sulfanilamide in Tuberculosis: Explanation of Certain Findings. H. J. Corper, M. L. Cohn and C. Bower, Denver.—p. 452.

**Tuberculosis in Nurses.**—According to Rhoads and his associates, from 1930 to 1937 inclusive fifty-two cases of tuberculosis were found in a group of 991 nurses. Ten of these were found within three months of the time the nurses came to Cook County Hospital, so that undoubtedly the nurses were already infected at the time they went on duty. Only one had a routine physical examination and roentgenogram of the chest on entrance to training at the hospital, when the tuberculosis was discovered. All the others presented satisfactory certificates of physical examination made just before their entrance. The need for roentgenograms of the chest was thus amply demonstrated. Particularly interesting was the fact that five affiliate nurses, who supposedly had been under supervision at their own hospitals up to the time they came to Cook County Hospital for training, were found to have active tuberculosis. Comparison of tuberculosis in nurses of Cook County Hospital with other groups of nurses and medical students shows that the incidence is about the same. Tuberculin testing at the Cook County Hospital has been done as a matter of routine only on the student groups and follow-up testing only for the past two years. In the relatively small group retested at the end of two years of training 62 per cent of those who originally had negative reactions to the Mantoux test now had positive reactions. Of the 778 graduates and permanent staff nurses tested after this survey was begun, 93.4 per cent were found to have positive reactions. In all likelihood tests on students at the end of three years would give comparable results. At the Cook County Hospital all students and many affiliates and graduates are required to take the regular tuberculosis service of three months. There is also exposure to active tuberculosis in the medical wards and orthopedic wards and in the children's hospital. The incidence of positive reactors among entering students is practically identical with that in other similar age groups in the general population. A striking feature of the present study is the high incidence of a family history of tuberculosis among those nurses in whom active disease developed (34.6 per cent of the group contracting active tuberculosis as compared with 4.7 per cent of 500 healthy nurses chosen at random from equal groups of students, affiliates, postgraduates and graduates); 23.1 per cent of those with active involvement had been on duty in wards of the tuberculosis hospital. Nearly half of the nurses with active infections who reported for examination did so because of loss of weight, indicating the value of monthly weight records for all nurses. Other symptoms were cough, fatigue, thoracic pain and fever. The nine instances in which there were no complaints but the infection was discovered only by roentgenograms of the chest seem to justify the considerable expense required for roentgenograms of the chests of all students and all positive reactors to the Mantoux test in the other groups. This examination is now being made. After consideration of these data a program for preventing tuberculosis among nurses at the Cook County Hospital, similar to that originally suggested by Myers (1938), has gone into effect.

## Archives of Pathology, Chicago

**28:** 613-776 (Nov.) 1939

*Studies in Lipid Pneumonia: I. Lipid Pneumonia Due to Cod Liver Oil: II. Lipid Pneumonia Due to Liquid Petrolatum. I. Graef, New York.—p. 613.

Fat Excretion Through the Kidneys: Experimental Study. C. S. Scuderi, Chicago.—p. 668.

Etiology of Hypertension Resulting from Coarctation of Aorta. R. J. Brotchner, Minot, N. D.—p. 676.

Histologic Changes Following Vascular Spasm in Central Nervous System (Pitressin Episodes). A. J. Nedzel, Chicago.—p. 697.

Accepted and Disputed Concepts in Pathology of Pulmonary Tuberculosis. E. R. Long, Philadelphia.—p. 719.

**Studies in Lipid Pneumonia.**—According to Graef, during the last five years twenty-two cases of lipid pneumonia have been studied at Bellevue Hospital. Differential histochemical studies of the lipid were made in each case; in seven instances these studies were supplemented by chemical analysis, which corroborated the conclusions drawn from the microscopic observations. A study of the pneumonic lesions in fifteen cases revealed the presence of intracellular lipid considered to be liquid petrolatum. The earliest response to the aspiration of this oil is an outpouring of macrophages, which engulf the finely emulsified oil and accumulate in the alveoli. The aspiration of the oil may be associated with pyogenic infection. In infants it may lead to asphyxial pneumonia. Macroscopic lesions varied from small pseudotuberculous fibrous scars to lobar consolidation resembling gray hepatization of the lung. Microscopic lesions varied from an acute macrophagic response to dense proliferative scars with imprisoned globules of oil. Walsh and Cannon recommended the discontinuance of oils as vehicles for all nasopharyngeal medicaments on the evidence that drugs dissolved in oil act less effectively than those dissolved in isotonic saline solution. The manufacturers of oily "nose drops" should set a limit to the capacity of the droppers. The doses for infants and adults should be so adjusted as to prevent accumulation and free flow into the nasopharynx. With the present droppers from 3 to 6 cc. of liquid petrolatum may be introduced into the nares of small infants by unsuspecting parents, nurses or physicians. Adequate warning should be given the public against overdosage with any intranasal medication. The use of liquid petrolatum as a lubricant or therapeutic agent in the larynx and trachea should be stopped, in view of the difficulty of removing this lipid from the lung. The damage caused by the accumulation of even small amounts administered repeatedly over a long period is sufficiently great to warrant the replacement of this oil by other less irritating and more readily removed lipids. There is always the added danger of aspiration of other agents —bacteria, spores or fungi—with any nasopharyngeal liquid.

## Archives of Physical Therapy, Chicago

**20:** 593-656 (Oct.) 1939

Report of Committee on Radio Interference by High Frequency Currents. J. S. Coulter, Chicago; W. Bierman and K. G. Hansson, New York.—p. 598.

Further Development of Physical Therapy. W. H. Schmidt, Philadelphia.—p. 605.

Present Status of Education in Physical Therapy. O. N. Andersen, Chicago.—p. 609.

Fever Therapy Technic in Syphilis and Gonococcic Infections. H. W. Kendell, D. L. Rose and W. M. Simpson, Dayton, Ohio.—p. 614.

Combined Artificial Fever and Chemotherapy in Dementia Paralytica: Preliminary Report of Seventy Cases. A. E. Bennett, Omaha; J. C. Nielsen, Hastings, Neb.; A. H. Fechner, Lincoln, Neb., and P. T. Cash, Omaha.—p. 620.

## Delaware State Medical Journal, Wilmington

**11:** 211-230 (Oct.) 1939

What Price Depression. R. Sleyster, Wauwatosa, Wis.—p. 211.
Technic of Elective Cesarean Section Under Local Anesthesia. E. A. Schumann, Philadelphia.—p. 219.

## Georgia Medical Association Journal, Atlanta

**28:** 387-428 (Oct.) 1939

Georgia Menaced by Cancer. J. L. Campbell, Atlanta.—p. 387.
External Ear Diseases, Particular Reference to Fungoid Type: Preliminary Report. B. H. Minchew, B. E. Collins and M. M. Harris, Waycross.—p. 408.
Treatment of Malaria. J. A. Redfearn, Albany.—p. 412.

## Journal of Thoracic Surgery, St. Louis

**9:** 1-118 (Oct.) 1939

Demonstration of Cervicomediastinal Continuity with Comments on Extrapleural Extension of Mediastinal Abscess. E. E. Jemerin and H. Neuhof, New York.—p. 1.
*Cervicomediastinal Abscess Due to Nonperforative Trauma to Esophagus. E. E. Jemerin and L. L. Coleman, New York.—p. 11.
Pneumonectomy for Malignant and Suppurative Disease of Lung. R. H. Overholt, Boston.—p. 17.
*Foreign Bodies in Heart and Pericardium—Should They Be Removed? H. R. Decker, Pittsburgh.—p. 62.
Ligation of Left Main Hilus for Bronchiectasis with Survival of Lower Lobe. L. J. Leahy, Buffalo.—p. 80.
Bronchoscopic Mirror for Upper Lobe Visualization. P. W. Gebauer, Cleveland.—p. 89.
Acute Empyema with Brucella Abortus as Primary Causative Agent: Case Report. R. H. Macdonald, Saskatoon, Sask.—p. 92.
Thoracoplasty Retractor Harness. H. B. Hall, Minneapolis.—p. 94.
Transthoracic Phrenic Nerve Interruption. A. D. Crecca, Verona, N. J.—p. 97.
Stab Wound of Heart with Coronary Ligation. C. B. Olim and J. D. Hughes, Memphis, Tenn.—p. 99.
Stab Wound of Pulmonary Vein. J. C. Whitaker, New York.—p. 106.
Tuberculoma of Lung: Case Report. C. Haight and J. M. Farris, Ann Arbor, Mich.—p. 108.

**Cervicomediastinal Abscess and Esophageal Trauma.**—Jemerin and Coleman report two instances of the formation of periesophageal cervicomediastinal abscess following nonperforative instrumental trauma to the esophagus. No actual perforation of the viscus occurred. The trauma was insignificant and might occur at any well conducted esophagoscopic examination. Therefore these cases indicate that this complication should be watched for after any esophagoscopy, no matter how easily executed, if pain, dysphagia or fever follows the passage of the instrument. The authors believe that the sequence of events in their cases, in the absence of any demonstrable perforation, was probably as follows: Some degree of trauma to the esophagus took place during esophagoscopy, possibly with mucosal stripping and devitalization of the underlying esophageal wall by pressure. The devitalized tissue comprised a favorable nidus for anaerobic infection. Localized esophagitis in this area then occurred, spreading through it to the contiguous periesophageal tissue. The pathogenesis of this condition could be compared with that of peritonitis by seepage occurring from a diseased, inflamed intestine without any actual perforation. In one case it was not until this seepage of infection through the esophagus had already occurred that the process in the esophageal wall progressed to actual necrosis and perforation. This was shown by the time of appearance of methylene blue. In the other case, although a periesophageal suppuration was set up promptly, complete necrosis of the esophageal wall did not occur. Small loculations of air in the periesophageal tissue were observed in the roentgenograms taken prior to operation. This observation, ordinarily considered pathognomonic of esophageal perforation, was in these instances apparently due to the formation of gas by anaerobic bacteria.

**Foreign Bodies in Heart and Pericardium.**—Decker reviews the results in 100 cases of foreign bodies retained in the heart and pericardium from which he attempts to indicate whether the bodies should or should not be removed, whether the results justify their removal and also when the operation should be performed. There were eight deaths following forty-seven operations (17 per cent) as opposed to sixteen deaths among the fifty-three persons not operated on (30 per cent). When these figures are compared with statistics gathered by other investigators, the same average postoperative mortality but a much higher nonoperative mortality is observed. Of the sixteen deaths of patients not operated on six were due to bacteremia or to shock and hemorrhage from associated injuries, causes not specifically the result of cardiac damage from the foreign body. From their own results and the statistics of other investigators the authors conclude that one cannot argue with too much certainty for or against operation. However, it is possibly justifiable to make the following deductions: 1. It is relatively safe to remove foreign bodies from the pericardium. 2. It is relatively dangerous to allow sharp foreign bodies to remain in the heart because of their tendency to cause fatal perforation later. 3. It is relatively dangerous to leave foreign bodies free in the right heart owing to the risk of pulmonary embolism and infarction. 4. Large foreign bodies in the pericardium lead to a fatal issue and should be removed as early as practicable. 5. If, in the course of an operation to remove a foreign body, unfavorable cardiac symptoms develop, it is wise to delay. The course of events should be the guide as to whether or not operation should be performed later. 6. Foreign intramural fixed bodies usually do not cause death, nor do they shorten life. The conclusion appears to be that foreign bodies should not be removed simply because of their presence. No emergency exists among patients who survive the original trauma, unless one chooses to consider that free cavity bodies, sharp needle-like bodies and large objects need immediate or early surgical intervention. According to Matas, indications for removal cannot be formulated by mere statistics. They must be based on individual prognosis, the condition of the patient and the degree and duration of the disability.

## Maine Medical Association Journal, Portland

**30:** 279-310 (Nov.) 1939

Chemotherapy of Pneumonia. F. G. Blake, New Haven, Conn.—p. 279.
General Management of the Injured. J. J. Moorhead, New York.—p. 290.
Urologic Diagnosis. R. L. Huntress, Portland.—p. 295.

## Michigan State Medical Society Journal, Lansing

**38:** 925-1020 (Nov.) 1939

Certain Symptoms Common to the Nose, Explained on Physiologic Basis. H. I. Lillie, Rochester, Minn.—p. 939.
Cycloplegics. G. H. Mehney, Grand Rapids.—p. 947.
Our Guild. B. R. Corbus, Grand Rapids.—p. 948.
*Treatment of Paroxysmal Hiccup with Benzedrine Sulfate Inhalation. H. A. Hanelin, Marquette.—p. 951.

**Amphetamine Sulfate Inhalation for Hiccup.**—Not having any benzedrine sulfate tablets available, Hanelin asked a patient with paroxysmal hiccup of five hours' duration to inhale (once in each nostril) the volatile preparation of amphetamine sulfate. Relief from hiccups was instantaneous and without recurrence. He reports two similar cases (one following an operation) in which an inhalation of amphetamine sulfate resulted in complete abatement of the symptoms. The inhalation of amphetamine sulfate in the treatment of paroxysmal hiccup due to the usual systemic reaction, the author states, coincidentally stimulates the sympathetic nerve fibers of the gastrointestinal tract (through the thoracolumbar chain of sympathetics with subsequent stimulation) and releases the smooth muscle spasm possibly due to excessive vagus stimulation.

## Nebraska State Medical Journal, Lincoln

**24:** 361-400 (Oct.) 1939

Osteomyelitis in Children. A. R. Shands Jr., Wilmington, Del.—p. 361.
Treatment of Compound Fractures. J. A. Key, St. Louis.—p. 367.
The Urologist Turns to Medicine. G. Carroll, St. Louis.—p. 375.
Dagenan and Pneumonia. J. C. Nielsen and L. R. Nash, Ingleside.—p. 378.
Aleukemic Myelosis and Pernicious Anemia. A. S. Rubnitz, Omaha.—p. 381.
Physiology and Therapy of Menopause. C. S. Moran, Omaha.—p. 386.
Acrodynia. H. M. Jahr and R. C. Dornberger, Omaha.—p. 391.

## New England Journal of Medicine, Boston

**221:** 679-720 (Nov. 2) 1939

The Care of the Patient. D. Guthrie, Sayre, Pa.—p. 679.
*Effect of Kitchen Procedures on Vitamin C Content of Fruit Juices. T. H. Ingalls, Brookline, Mass.—p. 683.
Congenital Posterior Urethral Valve Causing Renal Rickets: Report of Case. H. A. Derow and M. L. Brodny, Boston.—p. 685.
Alcoholism and Attempted Suicide: Report of 143 Cases. M. Moore, Boston.—p. 691.
Obstetrics: Labor and Delivery. J. Rock, Brookline, Mass.—p. 694.

**Effect of Kitchen Procedures on Vitamin C in Fruit Juices.**—Ingalls says that since the isolation and synthesis of ascorbic acid it has been shown that it is readily oxidized in alkaline solutions and is relatively stable in acids. Heating

tends to increase the rate of oxidation, as does copper acting as a catalyst. When oxidation proceeds at a slow rate, the time factor becomes of added importance. Thus, although fresh cow's milk has an appreciable ascorbic acid content, too much of the vitamin is oxidized during milking, pasteurization and marketing to make that food a reliable antiscorbutic agent. The breast-fed infant is amply protected, since he contends neither with catalysts nor with time. It is apparent that it is not only the high vitamin content of citrus fruits but the protective acidity of the juice which makes them so efficacious as antiscorbutic foods, and so these substances have become a routine part of the diet of the artificially fed infant. Oxidation of ascorbic acid in orange, tomato and pineapple juices proceeds so slowly at ice box temperatures that the greater part of their vitamin C potency is retained after one or two days' refrigeration. The longer they stand, however, the greater is the destruction of the vitamin. Although the rate of oxidation is materially increased at room temperatures and greatly increased by boiling, it is not enough to necessitate particular caution in the ordinary kitchen handling and preparation of these juices. In his approximation of prophylactic doses the clinician can consider 50 cc. of orange juice (containing 25 mg. of ascorbic acid) as a nutritional unit equivalent to 150 cc. of tomato juice or 250 cc. of pineapple juice.

## New Orleans Medical and Surgical Journal

**92:** 235-288 (Nov.) 1939

Carcinoma of Uterus. J. C. Masson, Rochester, Minn.—p. 235.
Tuberculin Testing in Public Schools. J. L. Wilson, New Orleans.—p. 244.
Roentgen Ray in Early Diagnosis of Pulmonary Tuberculosis. L. J. Menville, New Orleans.—p. 247.
Value of Early Diagnosis in Pulmonary Tuberculosis. E. Hull, New Orleans.—p. 249.
Mortality of Thyroid Disease in Nonendemic Area: Analysis of 103 Consecutive Deaths, with Special Note on Liver Factor. F. F. Boyce, New Orleans.—p. 254.
Peritendinitis Calcarea. S. M. Copland and M. Michel, New Orleans.—p. 261.
Schistosomiasis: Report of Case. G. H. Hauser, New Orleans.—p. 265.
Primary Syphilis in an 89 Year Old Man: Report of Case. J. W. Tedder, New Orleans.—p. 270.

## Public Health Reports, Washington, D. C.

**54:** 1877-1910 (Oct. 20) 1939

Disabling Morbidity Among Industrial Workers, Second Quarter and First Half of 1939. W. M. Gafafer.—p. 1878.
Studies in Chemotherapy: X. Colorimetric Tests for Aromatic Hydroxylamines and for Further Oxidation Products of Aromatic Amines: Their Demonstration in Urine Following Sulfanilamide Administration. S. M. Rosenthal and H. Bauer.—p. 1880.

**54:** 1911-1964 (Oct. 27) 1939

*Recovery of Virus of Poliomyelitis from Stools of Healthy Contacts in Institutional Outbreak. S. D. Kramer, A. G. Gilliam and J. G. Molner.—p. 1914.

**Poliomyelitis Virus in Stools of Healthy Contacts.**—During an epidemic of poliomyelitis in a children's home Kramer and his associates isolated the poliomyelitis virus from well persons. At the time of the outbreak, thirty-four children were cared for in the home. Fourteen of these were of school age (from 5 to 16 years) and were permitted considerable freedom within the home and in its immediate neighborhood. The remaining twenty children were of infant and preschool ages; they were kept in an entirely separate wing of the institution and, with exceptions, had no direct contact with the older group. In addition to the regular residents of the home, approximately 250 neighborhood children used its facilities as a summer recreational center. Between Aug. 1 and 8, 1939, five cases of poliomyelitis, one fatal and the others nonparalytic, developed in the twenty infants and preschool children of the home. In these children a diagnosis of poliomyelitis was established from typical history, signs, symptoms and spinal fluid observations. Three additional children, for whom no definite diagnosis could be established, had fevers that lasted from twenty-four to forty-eight hours. Poliomyelitis virus was recovered from the stools of three out of twelve healthy children, contacts of these patients, and from two of the three children who had had noticeable fevers. Thus, including the five with clinical infections who were not examined for virus, ten of the twenty children harbored poliomyelitis virus at some time during the month of August. Virus was also recovered from the stool of the day nurse in charge of the infant and preschool group of children. Virus was again recovered from stools of two children taken nineteen days after the first positive stools were obtained. Thus, counting from the date of onset of the first case (August 1) to the date of collection of the last positive stool (August 30), the minimal limit of time in which the virus might have been present in some member of the group was thirty days. Poliomyelitis did not occur in any child less than 1 year of age, but stools from three of five children in this age group yielded virus. In three of the five cases, including the one terminating fatally, poliomyelitis occurred in children with recent tonsillectomies and adenoidectomies. However, there were three other children with recent tonsillectomies and adenoidectomies in whom the disease failed to develop. The facts involved in this institutional outbreak are consistent with a theory of transfer of infection by direct personal contact. Although they do not constitute conclusive proof of this they do offer corroborative evidence that the virus of poliomyelitis is usually spread by healthy carriers. After July 23 the only contacts had by the group of infants and preschool children within the home were with seventeen adult attendants, nine of whom were present daily and eight of whom were present from one to three times a week. One child had been traveling with his mother by automobile in New York State from July 2 to 23. Poliomyelitis developed in this child on August 8. Only one adult attendant was known to have had any association with poliomyelitis outside the institution. This man, a third year medical student in temporary charge of the institution, had played ping-pong during the first week in July with an adult in whom fatal poliomyelitis developed July 20. However, poliomyelitis virus was not recovered from the stool collected from the medical student August 10. The preschool children played daily in a small playground enclosed by a wire fence, which in turn was surrounded by a large playground used by the older children in the home and the neighborhood children. Play between the older and younger children was forbidden, but candy and other materials were passed through the fence, and the older children occasionally used the preschool children's swings. There were four cases of poliomyelitis reported within a radius of about five blocks of the home. The dates of onset of illness in these cases were July 23 and August 8, 12 and 17. A survey of 137 homes, selected at random in the same area, revealed cases of suggestive illnesses having onsets early in August but no other cases which could be definitely called poliomyelitis. None of the fourteen older children at the home were reported as having poliomyelitis. Only two of the adult attendants had any illness of any character during the period of the epidemic. The medical student already referred to had a headache and vague pains in the neck and shoulder but no fever from August 10 to 13. The night nurse had headache, diarrhea, nausea and vomiting from August 14 to 19. Virus was not recovered from her stool specimen collected August 26.

## Radiology, Syracuse, N. Y.

**33:** 421-550 (Oct.) 1939

Fractures of Neck of Femur. L. H. Garland and H. A. Hill, San Francisco.—p. 421.
Estrogenic Mammary Cancer in the Rat. C. F. Geschickter, Baltimore.—p. 439.
Relative Degrees of Radiosensitivity of Tissue. J. F. Elward and J. F. Belair, Washington, D. C.—p. 450.
Motility of Gastrointestinal Tract in Man as Observed in Planekymograms. G. A. Weltz, Munich, Germany.—p. 462.
Roentgen Diagnosis of Hemangioma of Long Bones. M. J. Nemenov, Leningrad, Soviet Union.—p. 465.
Visualization of Biliary Ducts by Means of Gas, Following Spontaneous Duodenal Ulcer Rupture. C. Gottlieb, New York.—p. 470.
Lymphogranuloma of Colon. R. A. Rendich and M. H. Poppel, New York.—p. 472.
Radiologic Evidence of Malignancy in Bone Tumors and Its Relation to Biopsy. J. F. Brailsford, Birmingham, England.—p. 476.
Teleroentgen Kymography: Its Application to Study of Heart Size, Output and Aortic Elasticity. H. E. Ungerleider and R. Gubner, New York.—p. 497.

## Rhode Island Medical Journal, Providence

**22:** 175-188 (Nov.) 1939

Obstructive Uropathy. A. Randall, Philadelphia.—p. 175.
*Bromide Intoxication. P. W. Preu, New Haven, Conn.—p. 179.

**Bromide Intoxication.**—Preu states that eighteen cases of severe bromide intoxication have been encountered in 2,000 consecutive admissions to the psychiatric inpatient service of the New Haven Hospital, with two deaths. It is evident, therefore,

that this condition is of considerable clinical importance and that it needs continued emphasis. The tendency of bromide to displace chloride and to accumulate in the tissues is the decisive factor in the production of intoxication. Dehydration and dietary deficiency are important contributing factors. Treatment of the intoxication depends on the administration of adequate amounts of fluids and chloride. Bromide should rarely be used in medical practice and never without the continuous supervision of a physician. The drug should not be given for more than a few days at a time unless the blood bromide level is determined and controlled. Its administration is clearly indicated only in the treatment of epileptic patients when phenobarbital and dilantin sodium in adequate dosage have failed to control the seizures. Psychologic treatment, not drugs, is indicated in mild tensional conditions and insomnia. If drugs must be used temporarily, barbiturates are more effective than bromide. Bromide has no place in the treatment of depression. Paraldehyde is to be preferred to bromide in the treatment of severe excitement, since bromide is ineffective unless dangerously large doses are given. Bromide should be used with caution in cases of arteriosclerosis, since delirium is readily produced if cerebral arteriosclerosis is present. Nephritis is a definite contraindication to the use of the drug. Bromide should not be used in cases of dehydration or severe malnutrition in which the body fluids and chlorides are low. The patient should be warned against the purchase of bromide in a drugstore without a prescription, and its sale without a prescription should be prohibited. All prescriptions for it should be marked "not to be refilled."

## South Carolina Medical Assn. Journal, Greenville

**35:** 269-296 (Nov.) 1939

The National Health Program. A. T. McCormack, Louisville, Ky.—p. 269.
Present Knowledge of Prophylaxis and Treatment of Tetanus. E. B. Saye, Spartanburg.—p. 275.
Cecostomy in Treatment of Cases of Advanced Appendicitis: Report of Twenty-Eight Cases. W. H. Prioleau, Charleston.—p. 280.
Influenzal Meningitis Treated with Sulfapyridine: Report of Two Cases with Recovery. J. I. Waring, Charleston.—p. 284.

## Surgery, Gynecology and Obstetrics, Chicago

**69:** 577-704 (Nov.) 1939. Partial Index

Endometriosis of Lungs: Experimental Production of Endometrial Transplants in Lungs of Rabbits. J. E. Hobbs and A. R. Bortnick, St. Louis.—p. 577.
*Effect of Obstetric Anesthesia on Oxygenation of Maternal and Fetal Blood, with Particular Reference to Cyclopropane. C. A. Smith, Boston.—p. 584.
Mercuric Chloride, Potassium Mercuric Iodide and Harrington's Solution in Skin Disinfection: Behavior and Uses. P. B. Price, Baltimore.—p. 594.
Maintenance of Life During Experimental Occlusion of Pulmonary Artery Followed by Survival. J. H. Gibbon Jr., Philadelphia.—p. 602.
*Thirty-Three Pregnancies in Diabetic Women. W. F. Mengert and K. A. Laughlin, Iowa City.—p. 615.
Congenital Bowing and Pseudarthrosis of Lower Leg: Manifestations of von Recklinghausen's Neurofibromatosis. C. G. Barber, Cleveland.—p. 618.
*Sulfanilamide Therapy in Severe Puerperal Infection. C. A. Gordon and A. H. Rosenthal, Brooklyn.—p. 631.
McClure-Aldrich Test in Water Balance Following Operation. H. C. Hopps, Chicago, and F. Christopher, Evanston, Ill.—p. 637.
Significance of Radiation Reaction in Carcinoma of Cervix Uteri. S. Warren, J. V. Meigs, A. O. Severance and H. L. Jaffe, Boston.—p. 645.
Multiple Myeloma. R. K. Ghormley and G. A. Pollock, Rochester, Minn.—p. 648.
Operative Technic for Treatment of Vesicovaginal and Ureterovaginal Fistulas. W. W. Scott and K. M. Wilson, Rochester, N. Y.—p. 663.
Acute Perforated Peptic Ulcer: Simple Closure Through a Short Transverse Incision. J. B. Hartzell and M. L. Sorock, Detroit.—p. 669.
Problems in Differential Diagnosis Between Urologic and Abdominal Lesions. H. L. Kretschmer, Chicago.—p. 671.
Inguinal Hernia: Application of Cardinal Principles in Repair of Inguinal Hernias. R. L. Ramos and C. C. Burton, Dayton, Ohio.—p. 688.

**Obstetric Anesthesia and Oxygenation of Blood.**—Smith attempted to correlate the degree of oxygenation of maternal and fetal blood with the type of anesthetic used and to discover the relationship between fetal anoxemia and the presence or absence of apnea in the newborn infant. He concluded that: 1. Oxygenation of maternal blood during labor but before delivery and anesthesia was comparable to that observed by other authors for maternal blood at delivery without anesthesia. The arterial blood during labor showed slight anoxemia. 2. Specimens of fetal blood at the moment of birth showed wide variations in oxygen content, presumably because of anatomic and other uncontrollable circumstances. As a rule the fetal blood at birth, even on the arterial side, was considerably deficient in oxygen. 3. In general, ether anesthesia definitely increased the oxygen capacity of maternal blood, and under this anesthesia fetal oxygenation appeared to be satisfactory. 4. Nitrous oxide, administered with at least 20 per cent of oxygen, produced definite maternal and fetal anoxemia. 5. Under cyclopropane, oxygenation of the maternal blood was elevated in both the arterial and the venous specimens. This phenomenon is probably not due to the high concentration of oxygen administered with cyclopropane. The blood of infants delivered under this agent was somewhat better oxygenated than those born under nitrous oxide-oxygen anesthesia. It contained less oxygen than the blood of infants delivered under ether or that reported in the literature for those delivered without obstetric anesthesia. 6. Pronounced anoxemia in the fetal blood at birth was not constantly accompanied by apnea of the newborn except in infants delivered under nitrous oxide-oxygen anesthesia. 7. Cyclopropane was present in the fetal blood in almost as high concentration as in the maternal blood. Only about half as much nitrous oxide was found in the fetal as in the maternal blood. 8. Judged by biochemical data, cyclopropane as an obstetric anesthetic appears to be perhaps less safe for the infant than the clinical appearance of the mother would indicate.

**Pregnancy and Diabetes.**—During a period of twelve years Mengert and Laughlin observed thirty-three pregnancies in twenty-eight diabetic women; these were encountered in a total of 9,105 deliveries, with an incidence of 1:276. These patients were managed conservatively, and concern was directed toward the diabetes rather than the pregnancy. A controlled diabetic woman who becomes pregnant is, obstetrically speaking, a normal woman. With this principle as a guide, the author did not induce labor or intervene surgically merely because the patient had diabetes. The usual rules of conservative obstetrics were followed, and intervention was instituted only for obstetric reasons accepted for the nondiabetic pregnant woman. Cesarean section prior to term is being used widely. The authors contend that when it is done on the diabetic pregnant woman the indication must be viewed as fetal and not as maternal. Priscilla White is especially emphatic in her belief that cesarean section is indicated. In her series of sixty-six personally observed cases there was a fetal salvage of 89 per cent, which the authors compare with the fetal survival rate of 81.8 per cent in their series under conservative management. Assuming that the four stillborn babies in this series might have been saved by abdominal delivery, although one of them weighed but 1,750 Gm., thirty-two otherwise unindicated cesarean sections would have been performed. This seems a prohibitive price to pay for four babies, especially after Plass and others have repeatedly called attention to the fact that cesarean section does not in itself conserve fetal life. On the contrary, the fetal mortality rate from cesarean section alone ranges between 8 and 16 per cent.

**Sulfanilamide Therapy in Severe Puerperal Infection.**—Gordon and Rosenthal gave sulfanilamide to 118 patients with severe puerperal infections of the genital tract. The usual predisposing factors are not discussed, but there were five patients with acute respiratory infection, one with suppurating paronychia, six with peritonitis and four with thrombophlebitis. In the septic abortion group there were twenty patients with abdominal tenderness, in eleven of whom there was evidence of peritonitis. Chills were observed in ten, and pelvic masses were prominent in eight. Two of the five deaths occurred in this group. Of the entire series, the clinical response to sulfanilamide therapy was good in forty-five and doubtful in forty-five, and there was no effect in twenty-three. The authors conclude that in mild cases of puerperal infection sulfanilamide is not indicated. Intrapartum infections should be treated with sulfanilamide at once. Optimal benefit may be expected with spaced maintenance doses of from 20 to 30 grains (1.3 to 2 Gm.) of sulfanilamide and moderate restriction of fluid, provided a large initial dose has been given the patient. In severe puerperal infections of the genital tract, whatever their etiology, sulfanilamide may be and should be used, provided the patient is in a hospital where its administration can be controlled. Daily blood counts for at least the first five days are essential.

## FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

### British Heart Journal, London

**1**: 269-364 (Oct.) 1939

*Effect of Potassium on the Heart in Man. W. A. R. Thomson.—p. 269.
Etiology of Lung Infarction. T. H. Belt.—p. 283.
*Herpes Zoster and Angina Pectoris. J. D. Spillane and P. D. White.—p. 291.
Sex and Age Factors in Acute and Chronic Valvular Disease. H. L. Sheehan and A. M. Sutherland.—p. 303.
Stenosis at Lower Bulbar Orifice of Infundibulum. H. W. Dryerre and R. Walmsley.—p. 325.
Volumetric Reconstruction of Heart in Health and in Disease: Radiologic Study. J. D. Spillane.—p. 333.
Kinked Carotid Artery That Simulates Aneurysm. J. Parkinson, D. E. Bedford and S. Almond.—p. 345.

**Effect of Potassium on Heart.**—The observation of certain changes in the electrocardiograms from patients who were receiving potassium salts induced Thomson to carry out a more careful study of the effects of such salts on the heart in man, not only to gain some information as to possible dangers in their therapeutic application, but also in an attempt to throw some light on their function in the etiology of certain disorders of the heart. A study has been made of the effect of potassium salts on the heart of twenty-four persons with various diseases. Potassium was given by mouth in the form of the citrate and the chloride, the usual dosage in the case of both salts being 5 Gm. three times a day at 8:30 a. m., 1:30 p. m. and 7 p. m., but several patients were given smaller amounts. Blood for the estimation of the serum cations was taken at noon. Electrocardiograms were almost all taken at the same time of day—shortly before the midday meal—with the patient in bed, and every care was taken to ensure that the standardization was uniform. In all instances they were taken both before and during the administration of potassium, and generally at least one was taken a week after it had been stopped. In fourteen of twenty-four cases the administration of potassium salts was followed by an increase in the height of the T wave in one or more leads. No correlation was found between the increase in the height of the T wave on the one hand and the amount of potassium given or the increase in the concentration of the serum potassium on the other, except that in the fourteen cases that showed this change the average increase in the level of the serum potassium was 8.3 mg. per hundred cubic centimeters, compared with 2.6 mg. per hundred cubic centimeters in the cases that showed no such change. In one case the T wave, which was diphasic in all leads before the administration of potassium salts, became more deeply diphasic while they were being given. In two cases definite degrees of heart block were produced by the administration of potassium salts. In one there was prolongation of the PR interval, while in the other sino-auricular block and nodal rhythm resulted with marked slowing and irregularity of the heart rate. The author discusses the similarity of these changes to those produced by vagal stimulation, by acetylcholine and by pitressin and advances the hypothesis that in each case they may be mediated through the action of the potassium ion on the myocardium. Regarding the clinical significance of this work, the author says that potassium salts, particularly in the form of the citrate, have long enjoyed a reputation as diuretics both in renal and in cardiac edema. The general assumption has been that large doses of potassium salts by mouth are not toxic on account of the rapidity with which they are excreted in the urine. That this is not always the case, however, is shown by the figures in the reported cases, and particularly is this so in chronic nephritis, the group in which potassium salts are usually administered as diuretics. In view of the marked disturbances which can be produced by the ingestion of potassium salts by mouth, their administration in cases of cardiovascular disease would seem to be contraindicated, or at least they should be given only in small doses.

**Herpes Zoster and Angina Pectoris.**—Spillane and White encountered twelve instances of herpes zoster in a series of 350 cases of angina pectoris. In ten instances the zoster appeared after the anginal attacks had become established, while in two the zoster preceded the angina. In the latter (cases 11 and 12) the zoster first appeared before the first anginal paroxysm. In case 11 the subsequent anginal pain involved the right shoulder and arm, where the zoster rash had appeared two and a half years before. In case 12 there were recurrent attacks of herpes zoster over the left chest in the eighteen months preceding the first anginal attack. In the remaining ten cases the anginal pains had been experienced first, in all but one for several years, and in the majority they were severe and frequent. The majority of patients were elderly, eight being over 60 years of age. All suffered from true angina of effort, relieved by nitrites, except one who had a syphilitic aneurysm of the ascending limb of the arch of the aorta. Electrocardiograms, taken in six cases, all showed evidence of coronary insufficiency. The distributions of the referred cardiac pain and herpetic eruption are outlined in diagrams. A fairly close segmental relationship is apparent between the two areas. After giving brief histories of the twelve cases, the authors raise the question whether the occurrence of herpes zoster in anginal subjects is fortuitous or whether it reflects some change in the posterior root ganglions. Having sifted the available evidence, they lean to the latter explanation and suggest that the zoster is a trophic manifestation of continued irritation of the posterior root ganglions by impulses from the diseased viscus. The evidence is marshaled as follows: 1. The similarity between the relative areas of distribution of the referred cardiac pain and the herpetic rash is so striking in several instances that coincidence seems highly improbable. 2. Several reports have been published of the appearance of herpes zoster over the distribution of referred pain in other disease conditions, such as biliary colic, renal colic, abdominal colic, pleurisy, pericarditis, appendicitis and arthritis. 3. The authors' contention gains support when it is recalled that other cutaneous lesions have been observed along the line of radiation of pain in angina pectoris. They suggest that repeated bombardment of spinal root ganglions by afferent impulses from the ischemic heart gives rise to antidromic impulses that lead to vasodilatation and blister formation in referred cutaneous areas. The herpetic eruption is thus a trophic manifestation of disease of the coronary vessels in these cases.

### British Medical Journal, London

**2**: 897-938 (Nov. 4) 1939

*Closed Intrapleural Pneumolysis. P. W. Edwards and A. Lynn.—p. 897.
Laboratory Methods in Diagnosis and Control of Fevers of Enteric Group. J. S. K. Boyd.—p. 902.
Cancer: Consideration of Curability and Role of Radiotherapy in Treatment. R. Paterson.—p. 904.
Complications of Gastric Ulcer: Description of Case. J. A. Martinez.—p. 907.
Use of Stored Blood for Transfusion: Interim Report. J. L. Hamilton-Paterson.—p. 908.

**Closed Intrapleural Pneumolysis.**—Edwards and Lynn report the results of 260 internal pneumolyses in an unselected series of 235 cases of pulmonary tuberculosis undergoing treatment by artificial pneumothorax. The indication for the operation was the presence of adhesions over the diseased area of lung, and in most cases these were associated with uncollapsed cavities. All adhesions were completely divided in 34 per cent of pneumothoraces and the x-ray examination of these showed a satisfactory collapse in 71 per cent. Only partial division of adhesions was possible in 55 per cent and roentgenologically 28 per cent of these showed a satisfactory collapse. The remaining 11 per cent were inoperable. After partial cauterization it has been found that the position of the remaining adhesions and their relation to cavities have an influence on the efficiency of the collapse. In some positions adhesions are more likely to interfere with efficient collapse than in others. When the apex of the lung has dropped below the clavicle, medial subapical adhesions do not prevent the closure of cavities in the upper lobe. Such adhesions may be left undivided unless they can be dealt with easily and safely. They may be left, if access is difficult, when a cavity well below the clavicle is held by lateral adhesions that can be cauterized. An apical symphysis is usually inoperable, though parts of such adhesions are sometimes divisible. This, however, does not lead to any obvious improvement and may result in the weakening of the walls of an adjacent cavity with perforation of the lung. Cauterization of lateral adhesions in the presence of an apical symphysis has no effect on apical

cavities but may result in closure of cavities below the level of the clavicle. Apart from effusions there were few complications, though the percentage of perforation of the lung was 2.3. Varying degrees of surgical emphysema occurred in many cases, and in six it was severe, extending to the neck and abdominal wall. Apart from discomfort to the patient, no ill effects resulted. Mediastinal emphysema was not observed. Pleural effusion (32 per cent) was the most frequent complication; transient effusions followed the operation in 8 per cent and persistent effusions in 24 per cent, more than half of which contained tubercle bacilli. Persistent effusions, especially those containing tubercle bacilli, had a definitely adverse effect on the result of the operation, frequently resulting in partial symphysis or obliteration of the pneumothorax. Persistent effusions were much more common in far advanced cases. Tuberculous effusions were also more frequent in cases in which any degree of pyrexia or a rapid sedimentation rate was present or in those in which an extensive cauterization was performed. In dealing with such cases, therefore, the possible advantages of the operation should be carefully weighed against the much greater liability to effusions. X-ray diagnosis of an inoperable apical symphysis was confirmed by thoracoscopy in forty-six cases. Apart from this group, x-ray examination was unreliable in determining the position or extent of the adhesions present. Stereoscopic examination was more reliable than fluoroscopy and anteroposterior roentgenograms but was not of enough value to warrant routine use.

## Journal of Laryngology and Otology, London

**54:** 611-648 (Oct.) 1939

Nontraumatic Ventilation Treatment of Nose and Sinuses. S. N. Parkinson.—p. 611.
Ascending Fibrosis of Esophagus and Its Relation to Presence of Islets of Gastric Mucosa. A. B. Kelly.—p. 621.

## Journal of Neurology and Psychiatry, London

**2:** 285-386 (Oct.) 1939

Factors in Functional Recovery Following Section of Oculomotor Nerve in Monkeys. M. B. Bender and J. F. Fulton.—p. 285.
*Familial Presenile Dementia: Report of Case with Clinical and Pathologic Features of Alzheimer's Disease. W. H. McMenemey, C. Worster-Drought, J. Flind and H. G. Williams.—p. 293.
Arhinencephaly. R. M. Stewart.—p. 303.
Functional Responses of Sympathetic Nervous System of Man Following Hemidecortication. D. J. Williams and J. W. Scott.—p. 313.
Swayback: Demyelinating Disease of Lambs with Affinities to Schilder's Encephalitis and Its Prevention by Copper. J. R. M. Innes.—p. 323.
Vitamin B Deficiency and Nervous Disease. C. D. Aring and T. D. Spies.—p. 335.

**Familial Presenile Dementia.**—McMenemey and his co-workers present a case of Alzheimer's disease with typical clinical and histologic observations. Investigation of the family history revealed the fact that three of four siblings of the previous generation, including their patient's father, suffered from a presenile dementia, which in all probability was identical with that of the patient. As in the case of familial Alzheimer's disease described by Lowenberg and Waggoner, the parents of the first affected generation were cousins.

## Journal of Pathology and Bacteriology, Edinburgh

**49:** 273-456 (Sept.) 1939. Partial Index

Experimental Production of Nephritis in Rats by Means of Parathyroid Hormone and of Vitamin D. B. Chown, Margaret Lee, J. Teal and R. Currie.—p. 273.
Some Effects of Administration of Estrogens on Organs of Castrated and Noncastrated Male Rats Partially Deprived of Vitamin A. E. M. Hume, R. Burbank and V. Korenchevsky.—p. 291.
Further Observations on Paget's Disease of the Nipple. R. Muir.—p. 299.
Corynebacterium Pyogenes Antitoxin Content of Animal Serums. R. Lovell.—p. 329.
Autoplastic Splenic Grafts: Their Use in Study of Growth of Splenic Tissue. R. M. Calder.—p. 351.
Observations on Musculature of Lung in Children. S. Engel and G. H. Newns.—p. 381.
*Infections with Bacterium Enteritidis in Infancy with Triad of Enteritis, Cholecystitis and Meningitis. Katharine J. Guthrie and G. L. Montgomery.—p. 393.
Effect of Passive Immunization on Experimental Virus Influenza in Mice. R. Hare.—p. 411.

**Bacterium Enteritidis in Infancy.**—Guthrie and Montgomery discuss a disease of infants that occurred in the form of a small epidemic and was characterized by enteritis, meningitis and sometimes cholecystitis. There were twenty-eight cases, and infections with organisms of the Bacterium enteritidis group were present in all. Sixteen of the cases terminated fatally. With one exception, a boy of 13, the ages of the patients varied from 36 hours to 2 years; sixteen were less than 1 month old, eighteen were boys and ten were girls. The first affected child was separated from the others both in point of time and as regards its infecting organism, which was Bacterium enteritidis variety dublin. All the other cases occurred the following summer within a few weeks, mainly in epidemic form, and were due to Bacterium enteritidis (Gaertner's bacillus). In the interval, no organisms of this group were isolated either in routine feces examinations or from the intestinal contents of enteritis cases, which were regularly taken for culture at postmortem examination. The source of infection was not traced but it was most probably milk. All the children showed moderately severe catarrhal enteritis with septicemia. Meningitis was present in more than one third and purulent cholecystitis in one seventh of the fatal cases. Eighteen of the twenty-seven children infected with Bacterium enteritidis were patients in the nursery of a maternity hospital and were undoubtedly infected there; four others, born at home and admitted moribund to the Royal Hospital for Sick Children, had no connection with one another and are examples of sporadic infection. The remaining five became infected in this hospital. They were the only cases which originated here and, since they occurred only in wards containing patients from the maternity hospital epidemic, were in all probability infected from them. All the children in the hospital epidemic had been for various reasons relegated to the sick nursery; the infection developed in this nursery and ceased only on its closure. Proof that the infection did not spread to the general wards of the maternity hospital was furnished by the negative results of feces examination from all the babies in the hospital, the only enteritidis strains isolated being from the babies in the one nursery.

## Lancet, London

**2:** 921-968 (Oct. 28) 1939

Chemotherapy of Meningococcic Meningitis: Review of 147 Consecutive Cases. H. S. Banks.—p. 921.
*Electrosurgical Operation in Gallbladder Diseases: Results of Thirteen Years' Experience. B. O. C. Pribram.—p. 927.
Role of Sympathetic Nervous System in Segmental Pain. W. G. Campbell.—p. 930.
Potassium Iodide and Ipecacuanha as Expectorants. S. Alstead.—p. 932.

**Electrosurgery in Gallbladder Diseases.**—The excellent healing obtained through accurate covering of the liver bed with peritoneum after subserous cholecystectomy without drainage led Pribram to seek similar results in more advanced cases, in which, owing to partial neurosis, advanced inflammation or scars, an exact subserous cholecystectomy (with knife or with scissors) was no longer possible. His idea was to destroy the inflamed mucosa and the inner layers down to the serosa from the inside, thus keeping the serous layer available for covering the hepatic bed with peritoneum. He started these experiments in 1922. At first he used the thermocautery but in 1926 began to use electrocoagulation, which is more quickly and more easily performed than thermocauterization. He describes his technic. Summarizing the advantages of the electrosurgical operation he stresses the following points: (1) It is especially valuable in cases of bad infection; (2) the healing tendency in these cases is as perfect as in simple cases; (3) closure of the abdominal wall without drainage is almost always possible when the process is limited to the gallbladder, and (4) electrocoagulation is the best method of dealing with abscesses of the liver in general. With electrosurgical methods there is no difference in the results, whether operation is undertaken in the acute or in the chronic stage. Even in very acute stages of serious inflammation there is no need to perform cholecystostomy as an emergency operation. Radical mucoclasis is performed at the same stage with an even smaller risk and lasting results. Analyzing more than 1,000 cases in which the electrosurgical operation was performed, the author found that the mortality was under 3 per cent. The electrosurgical operation and the ether method, combined with cholangiography, are his mainstays in dealing with gallstones and hepatobiliary diseases.

## Schweizerische medizinische Wochenschrift, Basel

**69:** 967-1072 (Oct. 28) 1939. Partial Index

Involvement of Eyes in Acrodynia in Children. E. Feer.—p. 973.
Eating of Bread as Cause of Numerous Cases of Poisoning by Lead Arsenate. W. Silberschmidt.—p. 975.
Spontaneous Rupture of Aorta in Two Brothers. H. von Meyenburg.—p. 976.
Hyperparathyroidism. P. Clairmont and W. Brunner.—p. 980.
Value and Significance of Vascular Changes in Fundus Oculi in Internal Diseases. W. Löffler.—p. 982.
Sepsis Caused by Influenza Bacilli. Monnier.—p. 984.
Question of Various Hereditary Factors in Congenital Clubfoot. R. Scherb.—p. 998.
*Diathermic Puncture of Ciliary Body a New Operation for Glaucoma. H. Wagner and H. Richner.—p. 1048.

**New Operation for Glaucoma.**—On the basis of a statistical analysis of the cases of glaucoma that were treated at the ophthalmologic clinic of Zurich during the years 1936-1939, Wagner and Richner demonstrate the great importance of the new method which Vogt devised for the treatment of glaucoma. It is a diathermic acupuncture of the ciliary body. Following thorough anesthesia and exposure of about 2 cm. of the superior or inferior or of the temporal or nasal half of the sclera, diathermic acupuncture is begun with a current strength of from 50 to 60 milliamperes and with a needle which is 0.5 mm. in length and has a caliber of from 0.15 to 0.18 mm. With this needle from ten to fifteen diathermic punctures are made in a belt-like arrangement, 3 mm. away from the limbus. Each puncture requires one half second and the distance between the punctures is from 0.5 to 1 mm. In the same manner an equal number of diathermic punctures are made 4 mm. away from the limbus and, if necessary, the same number are made at a distance of 5 mm. From some of the punctures, a watery or a stringy fluid exudes and there is a considerable reduction in tension. As soon as the bulbus is soft, the operation is terminated by suture of the conjunctiva. It is important that the diathermic punctures be made not too close to the limbus, because this involves the danger of corneal and lenticular injuries. The pains which develop several hours after the operation can be controlled by antineuralgic remedies. The statistical report presented by the authors reveals that this method of treatment was followed by normal pressure in 72.3 per cent of the cases. This figure is high when it is considered that in the majority of these cases one of the customary operations had failed or had been unsuitable. In acute and chronic primary glaucoma and in secondary glaucoma after iridocyclitis the authors perform the classic operations, but by means of diathermic puncture of the ciliary body they are now able to cure a large number of cases of glaucoma which formerly were incurable. The operative intervention is not difficult technically and it can be repeated several times without danger.

## Athena, Rome

**8:** 385-416 (Sept.) 1939. Partial Index

*Micromelena and Microhematuria in Early Diagnosis of Infantile Scurvy. G. Macciotta.—p. 394.
Primary Sarcoma of Retroperitoneal Lymph Nodes. G. Bolognesi.—p. 400.
Traumatic Diaphragmatic Hernia with Strangulation of Stomach and Colon: Case. F. Tempesta.—p. 410.

**Microscopic Hemorrhages in Infantile Scurvy.**—Macciotta calls attention to the frequency and significance of microscopic gastrointestinal and renal hemorrhages early in the development of infantile scurvy. In a group of 118 artificially fed infants under 18 months of age he observed two classes: (1) those fed with animal milk, which was frequently boiled, and (2) those fed with cereals (alone or with greens). None of the infants had congenital syphilis, tuberculosis or infection. In forty cases the appearance of minimal or microscopic hemorrhages was the only symptom of scurvy. Growth of the infants and the crasis of the blood were normal and there were neither gastrointestinal disorders nor asthenia. Minimal traces of blood appeared occasionally in the feces in thirteen cases. Microscopic hemorrhages were found on chemical examination of the feces in fifty-eight cases. Microhematuria existed in sixty cases. The minimal and microscopic hemorrhages disappeared in the course of the first week of administration of lemon juice or a daily dose of 0.4 or 0.5 Gm. of ascorbic acid in thirty-four cases. Hemorrhages were controlled after the twelfth day of treatment in all but nine of the remaining cases. In almost all cases blood disappeared simultaneously from the feces and the urine. The author especially observed eight infants of the group. He found that in minimal or microscopic hemorrhages preceding infantile scurvy the resistance of the capillaries is diminished and elimination of ascorbic acid through the urine is slight. Both resistance of the capillaries and elimination of ascorbic acid become normal at the end of a treatment consisting of from 0.05 to 0.07 Gm. of ascorbic acid administered daily by the parenteral route. Examination of the feces and urine of a group of normal breast fed infants used as controls gave constantly negative results for minimal and microscopic hemorrhages. According to the author the minimal or microscopic gastrointestinal and renal hemorrhages, occurring early in the development of infantile scurvy, are the result of disturbances of the metabolism of the ascorbic acid from avitaminosis in the presence of a special lability of the renal and intestinal capillaries. The lability is individual, which accounts for the different reactions of infants to artificial insufficient diets. The author therefore concludes that the evaluation of microhematuria and microscopic gastrointestinal hemorrhages in infants artificially fed or after debilitating diseases is of value for the diagnosis of avitaminosis which precedes infantile scurvy and points out the advisability of establishing vitamin or ascorbic acid treatment for the prevention of infantile scurvy.

## Beiträge zur klinischen Chirurgie, Berlin

**170:** 191-352 (Sept. 28) 1939. Partial Index

Operative Treatment of Umbilical Hernia. G. Schimkat.—p. 224.
Osteomyelitis of Os Calcis: Eleven Cases. H. Völkner.—p. 228.
Origin and Treatment of Postoperative Progressive Gangrene of the Skin. Werwath.—p. 235.
*Diffuse Angiomatosis of Medulla Oblongata and Spinal Cord with Central Gliosis, Syringomyelia, Cyst of the Pancreas, Renal Cysts and Cystic Hypernephroid Tumors of Both Kidneys (Lindau Syndrome). E. König and H. Schoen.—p. 239.
Observations on Acute Appendicitis. E. Derra and F. Aulenbach.—p. 266.
*Alimentary Psathyrosis. R. Kienböck.—p. 311.

**Angiomatosis of Medulla Oblongata.**—König and Schoen report a case in which a man aged 27 in the course of an illness of ten years' duration exhibited signs and symptoms of organic disease of the central nervous system. Death was apparently due to the involvement of the structures of the posterior occipital fossa. Necropsy revealed an extensive angiomatosis of the medulla oblongata and of the spinal cord involving predominantly the dorsolateral aspect of the latter. There were likewise present central gliosis and syringomyelia. The necropsy further revealed a cyst of the pancreas, cysts of both kidneys and bilateral hypernephromas. The authors interpreted these lesions as a result of a dysontogenic disturbance and their case as a typical example of a syndrome described by Lindau in 1926 and known since in the literature as the Lindau or Hippel-Lindau syndrome. The syndrome is not limited to the developmental disturbances of the mesodermal layer of the nervous system but may exhibit, as in this case, developmental defects of the ectodermal layer as well. A hereditary tendency had been noted by several authors. The patient's family exhibited distinct hereditary lesions.

**Alimentary Psathyrosis.**—Kienböck proposes the name "alimentary psathyrosis" to include cases previously described as "hunger osteomalacia" or "hunger osteopathy." A symptomatic secondary malacia may develop on the basis of primary alimentary psathyrosis, which is a special form of bone porosis. He would include under this term cases observed shortly after the World War as well as cases described under the terms osteomalacia, osteomalacia-like states and the so-called skeletal functional inadequacy. X-ray studies of these cases reveal numerous areas of rarefaction and secondary fractures in the long and short tubular bones, pseudarthroses, diffuse porosis, and unusually slender and curving bones. The pelvic bones may show areas of rarefaction, fractures and malposition, and the vertebral column may exhibit scoliosis, kyphoscoliosis, porosis and biconcave vertebrae. The "marschgeschwulst" of von Stechow and Köhler's disease of the metatarsals, two well known diseases of the foot, are to be regarded not as specific entities but as abortive forms of the disease under consideration. The clinical picture is one of pain along the bones, local tenderness, thickening and curving of the bones, fractures and disturbances of locomotion. In addition there are to be found an enlargement of the thyroid, thyrotoxic manifestations, tetany and metabolic disturbances. Early involvement of the thyroid may result in

retarded growth. The author believes that the primary factor is a disease of the thyroid which leads to a metabolic upset, which in turn causes disease of the bones. Inadequate or faulty diet, excessive fatigue and physical overexertion frequently play the part of secondary factors in activating a latent condition. The disease is seen with greater frequency in women than in men; the second and third decades give the highest age incidence, although the disease may be observed at any age. The disease manifestations may be mild, severe and even fatal. A correct dietetic hygienic regimen supplemented by orthopedic and surgical therapy is successful in arresting and even curing the less severe cases.

## Klinische Wochenschrift, Berlin

**18:** 1301-1332 (Oct. 7) 1939. Partial Index

Local and General Metabolism in Disturbances of Peripheral Blood Perfusion. M. Ratschow.—p. 1301.
Early Circulatory Disturbances. L. Delius.—p. 1306.
Demonstration of Tubercle Bacilli by Fluorescence Microscopy. H. Didion.—p. 1315.
Vitamin A Requirements of Human Subjects. W. von Drigalski and H. Kunz.—p. 1318.
*Treatment of Anemia of Prematurely Born Infants and of Postinfectious Anemia by Substances of Respiratory Ferment System. O. Göbell.—p. 1319.
Percutaneous Resorption of Insulin. G. Kingisepp and L. Talli.—p. 1323.

**Active Substances of Respiratory Ferment System in Anemias.**—Göbell shows that treatment neither with iron nor with vitamin C produced satisfactory results in the anemia of prematurely born infants. He based his own etiologic investigations in this form of anemia on the fact that the erythrocytes serve as vehicle in the hydrogen-oxygen exchange. The mobilization of hydrogen is an enzymatic process. A chain of enzymes with oxydoreductive capacities bridge the considerable electrical tension between the positive oxygen and the negative hydrogen. Enzymes consist of a coferment and an apoferment, the latter effecting the fixation of the coferment on the cell. Synthesis is produced by the adrenal cortex. The active constituent of the coferment is a vitamin, which likewise cannot be utilized without the adrenal cortex. If the hydrogen-oxygen exchange is slowed down for instance by failure of the adrenal cortex or of the respiratory ferment system activated by it, be it as a result of impairment of the adrenal function or by deficiency in the vitamins of the respiratory ferment system, the resulting reduction in oxygen consumption requires oxygen vectors rather than erythrocytes. The author tried nicotinic acid amine and riboflavin, which are constituents of cozymase and of the flavin enzyme, in the treatment of the anemia of prematurely born infants and he observed a favorable effect. He concludes from this that a relative deficiency in these factors plays a part in the pathogenesis of this form of anemia. However, he saw no increase in erythrocytes following the administration of adrenal cortex extract. In the treatment of postinfectious anemia of nurslings and small children he employed adrenal cortex extract and nicotinic acid amide. He found that the hemoglobin content and the erythrocyte count increased in a comparatively short time and thinks that this is due to the fact that the adrenal cortex or its function is impaired by the infection. There is an arrest in the cure of anemia by the aforementioned preparations, when a new infection develops. This observation was made also in the course of iron therapy.

## Nederlandsch Tijdschrift v. Geneeskunde, Amsterdam

**83:** 4825-4900 (Oct. 7) 1939. Partial Index

Diagnosis and Treatment of Ureteral Calculi. W. F. Suermondt.—p. 4828.
Apophysiolysis of Tuberosity of Tibia. J. J. Nierstrasz.—p. 4834.
*Spondylitis in Brucellosis (Undulant Fever). C. P. H. Teenstra and A. Kropveld Jr.—p. 4839.
Complete Removal of Thyroid in Heart Disease. E. W. Sikemeier.—p. 4846.

**Spondylitis in Brucellosis.**—Teenstra and Kropveld point out that the symptomatology of brucellosis varies and that on the basis of the predominating symptoms different forms of brucellosis have been differentiated: (1) the catarrhal form, (2) the gastro-enteritic form and (3) the arthritic form. That the arthralgic form is of considerable importance is indicated by the fact that Malta fever, a form of brucellosis, in southern France is popularly known as "mal de os" (bone illness). The arthralgic form of brucellosis occasionally involves the vertebral joints. This the authors demonstrate by reviewing the literature and by describing a case of their own observation. This form of spondylitis is characterized by painfulness, which may be spontaneous or elicitable by percussion of the spinous processes and by stiffness of the back. Occasionally pains may radiate toward the sciatic region. In case the spondylitis is located higher, these pains in the roots may simulate abdominal disorders. The reflexes may be intensified or weakened and occasionally there occur changes in the motility and sensitivity. These neurologic symptoms corroborate Roger's observation of a special affinity of Brucella for the central and peripheral nervous system. X-ray examinations disclose either no changes or only slight decalcifications, the latter being much less severe in brucellosis than in tuberculous spondylitis. In the reported case the existence of a brucellosis was proved by the high agglutination titer, the fever curve, the palpable spleen and the blood picture. The spondylitis involved the thoracal region and was complicated by a paravertebral abscess. The fact that the vertebral process disappeared within five months the authors regard as proof that tuberculous spondylitis can be ruled out and that the spondylitis was caused by brucellosis.

## Geneeskundig Tijdschr. v. Nederl.-Indië, Batavia

**79:** 2433-2496 (Sept. 26) 1939

Two New Cases of Mite Fever in Java. J. W. Wolff and W. de Graaf.—p. 2434.
*Flit Dermatitis Caused not only by Flit: Differences in Dermatotrophic and Insecticidal Reactions Between Flit, Sheiltox and Other Insecticides. R. D. G. P. Simons and Jenny Simons-Jantzen.—p. 2442.
Serodiagnosis of Syphilis: A Word of Warning. L. Kirschner.—p. 2454.

**Dermatitis Caused by Insecticides.**—Simons and Simons-Jantzen point out that "flit," an insecticide, has caused many cases of dermatitis. However, they found that the term "flit" dermatitis was applied erroneously also to forms of dermatitis which were caused by other types of insecticides. They show that the erroneous use of the term flit dermatitis or flit eczema may lead to mistakes in treatment. The patient may be told to avoid the use of flit, when the real cause of his dermatitis was a different insecticide, which he continues to use, thereby making cure impossible or bringing on a new attack. The authors proved by means of patch tests that there may be hypersensitivity to some and not to other insecticides. Occasionally, tests with the same insecticide were negative on the thigh and positive on the back. Perspiration or covering of the skin with bandages or clothing promotes the development of the dermatitis. In order to determine which constituents of the insecticides irritate the skin, with a view of perhaps omitting them without impairment of the insecticidal power, the known constituents were tested separately for their dermatotropic and their insecticidal properties. The substances which proved irritating to the skin were oil of lemon, oil of turpentine and perhaps pyrethrum powder. Without direct contact with the insects these substances did not kill the insects. Thus the constituents which irritate the skin could be omitted without greatly impairing the insecticidal power. The authors tested the different insecticides also with regard to insecticidal efficacy, inflammability and the likelihood of producing spots. They emphasize that the term flit dermatitis either must be interpreted as covering the dermatitides caused by flit as well as by other insecticides or it must be replaced by the term "insecticide" dermatitis.

## Acta Chirurgica Scandinavica, Stockholm

**83:** 1-184 (Oct. 16) 1939. Partial Index

Bone Regenerating Capacity of Periosteum. G. Levander.—p. 1.
Posttraumatic Late Meningitis After Fracture of Base of Skull. T. Skoog.—p. 27.
Contribution to Knowledge of Importance of Impurities in Diethyl Ether Used for Narcosis: First Report (Acetaldehyde). L. Gisselsson and G. Lindgren.—p. 45.
*Some Experiences in Operation for Cleft Palate. E. Perman.—p. 83.
Hyperinsulinism and Surgery. E. Akerberg.—p. 104.
*Tuberculous Spondylitis: Clinicostatistical Study. T. Walheim.—p. 123.
*Treatment of Hydronephrosis and Renal Pain by Denervation of the Kidney. G. Bauer.—p. 160.

**Operation for Cleft Palate.**—Perman reports observations in sixty-five cases of cleft palate in which surgical treatment was given at a Stockholm hospital. In five, operation had been performed previously. Of the secondary operations, two were successful and three were failures. Of the sixty children in whom the operation was the primary intervention, thirty-three

were under 3 years of age. In the majority of cases the author used Ernst's method. However, a celluloid plate in the palate was used only for the older children. This plate is unnecessary in children of the age of about 2 years. At this age operation is facilitated by the fact that the abnormal enlargement of the pharyngeal region has not yet come into play. Around the palatal musculature and from the large lateral incisions a silk horsehair suture was made, which affords good fixation of the soft palate upward and backward. This suture corresponds to Veau's wire suture. Of the sixty children undergoing primary operation, one died on account of severe infection of the operative area. In two cases the palatal suture broke away on account of scarlet fever. In still another case, in which Veau's method was employed, the palatal suture broke through completely but healed after reoperation. In three cases the suture healed with a split from 1 to 1.5 cm. in length. In the remaining fifty-three cases healing was complete, in six cases with an insignificant fistula.

**Tuberculous Spondylitis.**—Walheim presents a clinicostatistical study of the cases of tuberculous spondylitis treated at the department of surgical tuberculosis at St. Göran's Hospital in Stockholm. The material consists of 221 cases in which treatment was administered between 1913 and 1930. Of these, 149 were subjected to Albee's operation and seventy-two were given conservative treatment. Previous to the operation the patient is put in a plaster bed. After he has become accustomed to it, a cruciform pad is placed under the hump, if there is one. The pad is added to every week, and when it has become too high the patient is placed in a new plaster bed which better fits the changed configuration of the spine. When the back has become straight and the patient is in good condition, Albee's operation is performed, a graft from the tibia being used. The patient spends from two to three months in a plaster bed after the operation. When this period is over, the patient is allowed up in a plaster corset with a fenestra in the back over the diseased vertebrae. Wadding is inserted through the fenestra and kept under constant pressure. After a further two or three months the patient is given a leather corset, which he wears for about one year. The patients given conservative treatment stay in a plaster bed for varying lengths of time, depending on the nature of the disease. The corset treatment is the same as for the operatively treated. A review of the results of operative and conservative treatment reveals that the final results are distinctly better in the cases in which surgical treatment is employed. The period of hospitalization was somewhat longer for the patients operated on. This is due partly to the late date at which the operation was performed and partly to the fact that the conservatively treated patients were often admitted when the disease was further advanced. The disease lasted considerably longer in the conservatively treated, owing to some extent to complications such as fistulas. Finally there is obviously a greater tendency to recurrence in the conservatively treated group. The evaluation of the clinical results is based on a follow-up investigation which covers 90 per cent of the surviving patients. When doubt was felt as to these results, an x-ray examination was made. Complete freedom from symptoms was found in 82.7 per cent of the operatively treated and 73.5 per cent of the conservatively treated. With regard to the orthopedic therapy, the correction of gibbuses showed good results in 90 per cent of the operative and 74 per cent of the conservative cases. There was no difference worthy of mention in the spinal mobility of the patients in the two groups.

**Denervation of Kidney in Hydronephrosis.**—Bauer shows that, in certain cases of pain suspected to be of renal origin, routine urologic examination does not yield demonstrable pathologic conditions or else gives evidence of a low grade hydronephrosis without evident mechanical cause. Research by the Harrises as well as others has made it probable that such pain is caused by a state of spasm in the annular muscles of the renal calices and pelvis as a result of excessive sympathetic nerve impulses to the kidney. Consequently it should be possible to eliminate the cause of the pain by denervation of the kidney. The author reports eleven cases in which treatment was administered by him in accordance with this theory. The pain had in all cases been of several months' or even years' duration, generally with intermittent colicky attacks of a severe nature and at ever shorter intervals. Urologic examination was negative with the exception of a low grade hydronephrosis and delayed emptying of the opaque medium from the pelvis or from a single calix. By the pain reproduction test, which consists in distending the renal pelvis with saline solution injected with the aid of a ureteral catheter, it was possible to induce a typical attack of pain, which was identified by the patients with their previous pain. Following remarks about the surgical technic, the author says that the results of the renal denervation were favorable. All patients were completely freed from pain. To be sure, in only four of the cases does the time of observation exceed a year. No serious complications occurred. On after-examination, the denervated kidneys were found to produce a normal amount of normal urine. In only one case was the rate of secretion diminished.

## Bibliotek for Læger, Copenhagen

**131:** 403-433 (Oct.) 1939

*Osteoporosis and Osteomalacia of Spinal Column. A. Zacho.—p. 403.

**Osteoporosis and Osteomalacia of Spinal Column.**—Zacho says that the cause of the pure primary form of this disorder is almost always deficient diet, usually avitaminosis A, while the etiology of the secondary form may depend partly on disturbances in resorption (in disorders of the gastrointestinal tract, liver, biliary tract and pancreas), partly in excretion (in renal disorders) and finally on disturbances in internal secretion. In the form due to disturbances in resorption there is usually deficient resorption of vitamin D and eventually also of calcium salts. The bone disorder of the author's first patient, a woman aged 53 with the menopause at the age of 36, is ascribed to achylia. The second patient, a man aged 58, had simultaneously an avitaminosis A, which yielded to the administration of vitamin A. The bone disorder is attributed to an old dyspepsia (gastritis and enterocolitis). The cause of the disorder of the third patient, a woman aged 72 with typical changes of osteomalacia in the spinal column, is thought possibly to be defective digestion of fat. In all cases treatment with vitamin D and calcium preparations was effective.

## Nordisk Medicin, Helsingfors

**4:** 2983-3044 (Oct. 7) 1939. Partial Index

### Hygiea

Pancreatogenic Excessive Enlargement of Liver in Children (Preliminary Report). B. Söderling.—p. 3001.
*Metrazol in Treatment of Barbiturate Intoxication. S. Kallner and T. Rudberg.—p. 3006.
Noise and Measurement of Noise from Hygienic Point of View. R. Huss and N. Nordling.—p. 3007.

**Metrazol in Treatment of Barbiturate Intoxication.**—Kallner and Rudberg report the results obtained in the treatment of a woman aged 49 admitted twelve hours after she had taken about 46 cc. of somnifen. The reflexes were absent, the temperature was below 95 F., the respiration poor. During the course of the next twelve hours a total of 62 cc. of pentamethylenetetrazol was given intravenously, during the second day 105 cc., on the third day 30 cc., and on the fourth day 40 cc. The respiration improved after each injection, the corneal reflexes appeared on the third day and the patient regained consciousness and the remaining reflexes appeared on the fourth day. The drug was always injected slowly, the last times together with dextrose solution. The patient reacted favorably after all the injections.

**4:** 3045-3118 (Oct. 14) 1939. Partial Index

### Hygiea

Is Anastomosis Legitimate Intervention in Cases of Bile Duct Stone? G. Redell.—p. 3093.
Can Regular Insulin and Protamine Zinc Insulin Be Mixed Before Injection? S. Bjuggren.—p. 3099.
*Roentgenologic Effect of Ramstedt's Operation in Pyloric Stenosis. F. Knutsson and S. Rudberg.—p. 3101.

**Effect of Ramstedt's Operation in Pyloric Stenosis.**—On after-examination of seven children operated on during the first months of life for pyloric stenosis, Knutsson and Rudberg found that the operation affects only the clinical condition. The roentgenologic stenosis persists for several years, gradually disappearing as in the cases in which only medical treatment is given, as described by Runström and Wallgren.